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To: Steve Morrow
From: Chris Ricardi
Date: December 13, 2010
Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 3Q10 – September 2010

DATA VALIDATION REPORT
SEPTEMBER 2010 SLURRY WALL SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-29918-1, 360-29919-1, and 360-30036-1

1.0 INTRODUCTION

Groundwater and surface water samples were collected from the Olin Chemical Superfund Site from August 30 to September 9, 2010. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-29918-1, 360-29919-1, and 360-30036-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- general chemistry analyses for ammonia by USEPA Method 350.1 (Lachat 10-107-06-1), chloride, sulfate, nitrate, and nitrite by USEPA Method 300, nitrite by SM20 SM 4500B, and specific conductance by SM18 SM 2510B

The Draft Interim Response Steps Work Plan (MACTEC, 2007) and the MassDEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MassDEP, 2004] were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington monitoring tasks. Final sample results are presented on data summaries in Table 2. A summary of validation qualification actions is presented on Table 3 for results that were qualified. Validation reason codes are associated with final results that have been qualified as indicated in Table 3.

2.0 METALS

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
  Blanks
* Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
* Matrix Spike Analysis
* Field Duplicate Results

* Detection Limits
  Dissolved vs. Total Metals Comparison

***** = indicates that criteria were met for this parameter

Blanks

In SDG 360-29919-1, chromium was reported in the method blank at 2.48 µg/L. A similar concentration was reported in associated sample OC-ISCO 3, and the result was qualified as non-detect (U) in the final data.

Dissolved vs. Total Metals Comparison

Dissolved aluminum and dissolved sodium concentrations were over ten percent greater than total sodium concentrations in a subset of surface water samples in SDG 360-29919-1 and 360-30036-1 as presented in the table below. The results for total and dissolved sodium in these samples were qualified estimated J.

SDG	fraction	lab_sample_id	field_sample_id	Sodium result (µg/L)	% Dissolved amount is greater than Total amount	Final Qualifier
360-29919-1	Dissolved	360-29919-2	OC- ISCO 1	55000	17%	J
360-29919-1	Total	360-29919-2	OC- ISCO 1	47000		J
360-29919-1	Dissolved	360-29919-4	OC- ISCO 3	91000	15%	J
360-29919-1	Total	360-29919-4	OC- ISCO 3	79000		J
360-30036-1	Dissolved	360-30036-1	OC-SD17SW	120000	21%	J
360-30036-1	Total	360-30036-1	OC-SD17SW	99000		J

SDG	fraction	lab_sample_id	field_sample_id	Aluminum result (µg/L)	% Dissolved amount is greater than Total amount	Final Qualifier
360-29919-1	Dissolved	360-29919-2	OC- ISCO 1	1100	16%	J
360-29919-1	Total	360-29919-2	OC- ISCO 1	950		J

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

* Data Completeness
  Holding Time
* Blanks
  Matrix Spike Analysis
* Field Duplicate Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
* Detection Limits

* = indicates that criteria were met for this parameter

Holding Time – Nitrate

Sample OC-PZ 17 RR SW was analyzed three hours beyond the 48 hour holding time. The result for nitrate in sample OC-PZ 17 RR SW was qualified estimated (J).

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

12/13/2010

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Michael Murphy
Project Principal

1/12/11

Date

References:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.

MACTEC Engineering and Consulting, Inc. (MACTEC), 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; July 25, 2007.

Massachusetts Department of Environmental Protection (MassDEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.

Table 1
Sample Summary - 360-29918-1, 360-29919-1 & 360-30036
Data Validation Report
September 2010 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-B)	SM 2510B	40CFR136A 300.0	A4500 NO2_B
Lab Sample ID	**Location**	**Sample ID**	**Sample Date**						
Slurry Wall / Cap Groundwater									
360-29918-1	GW-79S	OC-GW 79S	8/30/2010		2	1	1	2	
360-29918-2	GW-202D	OC-GW 202D	8/31/2010		2	1	1	2	
360-29918-3	GW-202S	OC-GW 202S	8/31/2010		2	1	1	2	
360-29918-4	GW-202S	OC-GW 202S DUP	8/31/2010		2	1	1	2	
360-29918-5	OC-PZ-18R	OC-PZ 18R	8/31/2010		2	1	1	2	
360-29918-6	PZ-16RR	OC-PZ 16RR	8/31/2010		2	1	1	2	
360-29918-7	OC-PZ-17RR	OC-PZ 17RR	9/1/2010		2	1	1	2	
360-29918-8	GW-78S	OC-GW 78S	9/1/2010		2	1	1	2	
360-29918-9	GW-25	OC-GW 25	9/1/2010		2	1	1	2	
Slurry Wall / Cap Surface Water									
360-29919-1	PZ-18R	OC-PZ 18 R SW	9/1/2010	3	3	1	1	3	1
360-29919-2	ISCO1	OC-ISCO 1	9/1/2010	3	3	1	1	3	1
360-29919-3	ISCO2	OC-ISCO 2	9/1/2010	3	3	1	1	3	1
360-29919-4	ISCO3	OC-ISCO 3	9/1/2010	3	3	1	1	3	1
360-29919-5	PZ-16RR	OC-PZ 16 RR SW	9/1/2010	3	3	1	1	3	1
360-29919-6	PZ-17RR	OC-PZ 17 RR SW	9/1/2010	3	3	1	1	3	1
360-30036-1	SD-17	OC-SD17SW	9/9/2010	3	3	1	1	4	

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 09/24/10
Checked by / Date: WDC 10/8/10

Table 2
Final Results Summary
September 2010 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-202D		GW-202S		GW-202S		GW-25		GW-78S		GW-79S		PZ-16RR	
			Field Sample ID	OC-GW 202D		OC-GW 202S		OC-GW 202S DUP		OC-GW 25		OC-GW 78S		OC-GW 79S		OC-PZ 16RR	
			Field Sample Date	08/31/10		08/31/10		08/31/10		09/01/10		09/01/10		08/30/10		08/31/10	
			QC Code	FS		FS		FD		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-29918-1		360-29918-1		360-29918-1		360-29918-1		360-29918-1		360-29918-1		360-29918-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
D	SW6010	Aluminum	ug/l	13000		100	U	100	U	100	U	100	U	100	U	100	U
D	SW6010	Chromium	ug/l	1000		5.3		5.7		2.5	J	2.5	J	23		2.1	J
N	E300	Chloride	mg/l	230		65		66		100		24		200		250	
N	E300	Sulfate	mg/l	1900		490		490		100		590		830		520	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	240		70		62		44		41		120		100	
N	A2510B	LAB SPECIFIC CONDUCTANC	umhos/cm	4700		1300		1300		720		1300		2700		2300	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
September 2010 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	PZ-17RR		PZ-18R	
			Field Sample ID	OC-PZ 17RR		OC-PZ 18R	
			Field Sample Date	09/01/10		08/31/10	
			QC Code	FS		FS	
			Lab Sample Delivery Group	360-29918-1		360-29918-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual
D	SW6010	Aluminum	ug/l	100	U	100	U
D	SW6010	Chromium	ug/l	4.4	J	12	
N	E300	Chloride	mg/l	20		190	
N	E300	Sulfate	mg/l	510		170	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	59		52	
N	A2510B	LAB SPECIFIC CONDUCTANC	umhos/cm	1300		1200	

Notes:

Prepared by / Date: KJC 10/11/10

Checked by / Date: VDC 10/11/10

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
September 2010 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-18R		SD-17	
			Field Sample ID	OC-ISCO 1		OC-ISCO 2		OC-ISCO 3		OC-PZ 16 RR SW		OC-PZ 17 RR SW		OC-PZ 18 R SW		OC-SD17SW	
			Field Sample Date	09/01/10		09/01/10		09/01/10		09/01/10		09/01/10		09/01/10		09/09/10	
			QC Code	FS		FS		FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-29919-1		360-29919-1		360-29919-1		360-29919-1		360-29919-1		360-29919-1		360-30036-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
T	SW6010	Aluminum	ug/l	950	J	360		35	J	1100		940		1000		1200	
T	SW6010	Chromium	ug/l	15		65		1.8	U	220		210		18		290	
T	SW6010	Sodium	ug/l	47000	J	140000		79000	J	140000		130000		55000		99000	J
F	SW6010	Aluminum	ug/l	1100	J	56	J	100	U	69	J	170		1100		250	
F	SW6010	Chromium	ug/l	10		13		5	U	13		66		12		110	
F	SW6010	Sodium	ug/l	55000	J	150000		91000	J	140000		140000		61000		120000	J
N	E300	Chloride	mg/l	60		170		190		250		230		64		170	
N	E300	Nitrate as N	mg/l	0.29		3.1		1		5.1		4	J	0.22		1.8	
N	E300	Nitrite as N	mg/l													0.1	U
N	A4500_NO2_B	Nitrite as N	mg/l	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U		
N	E300	Sulfate	mg/l	180		480		22		180		200		200		310	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	19		63		0.7		19		25		21		36	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	620		1600		720		1200		1200		660		1200	

Notes:

Prepared by / Date: KJC 10/11/10

Checked by / Date: WDC 10/11/10

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 3
Data Validation Action Summary
September 2010 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample Delivery Group	Lab Sample ID	Analysis Method	Field Sample ID	Parameter	Lab Result	Lab Qualifier	Final Result	Final Qualifier	Validation Reason Code	Result Units	Refuse Flag
360-29919-1	360-29919-2	SW6010	OC-ISCO 1	Aluminum	1100		1100	J	TD	ug/l	N
360-29919-1	360-29919-2	SW6010	OC-ISCO 1	Aluminum	950		950	J	TD	ug/l	N
360-29919-1	360-29919-2	SW6010	OC-ISCO 1	Sodium	55000		55000	J	TD	ug/l	N
360-29919-1	360-29919-2	SW6010	OC-ISCO 1	Sodium	47000		47000	J	TD	ug/l	N
360-29919-1	360-29919-4	SW6010	OC-ISCO 3	Chromium	1.8	J B	1.8	U	BL	ug/l	N
360-29919-1	360-29919-4	SW6010	OC-ISCO 3	Sodium	91000		91000	J	TD	ug/l	N
360-29919-1	360-29919-4	SW6010	OC-ISCO 3	Sodium	79000		79000	J	TD	ug/l	N
360-29919-1	360-29919-6	E300	OC-PZ 17 RR SW	Nitrate as N	4	H	4	J	HT	mg/l	N
360-30036-1	360-30036-1	SW6010	OC-SD17SW	Sodium	99000		99000	J	TD	ug/l	N
360-30036-1	360-30036-1	SW6010	OC-SD17SW	Sodium	120000		120000	J	TD	ug/l	N

Units:
mg/L = milligram per liter
ug/L = microgram per liter
ng/L = nanogram per liter

Validation Qualifier:
U = not detected, value is the detection limit
J = value is estimated
R = rejected

Validation Reason Codes:
BL = QC Blank Qualifier
HT = Holding time exceeded
TD = Dissolved concentration exceeds total

Prepared by / Date: KJC 10/11/10
Checked by / Date: WDC 10/11/10

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 10/8/10
Sr. Review/Date Chris Ricardi 11/15/10
Lab Report # 360-29918-1
Project # 610710000/6.12

Aluminum, chromium - dissolved

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected?~~ analyzed? List project samples that were spiked. @ 10/9/11.

Yes [✓] No [ ] N/A [ ] Comments: MS analysis for aluminum and chromium performed on sample OC-GW795 (760-29918-1).

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	~~N/A~~	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments: Field Duplicate set OC-GW 2025 (360-29910-3) and OC-GW2025 DUP (360-29910-4).

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☑ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments:

Analyte	Orig (µg/L)	Dup (µg/L)	RPD (%)
Aluminum	100 U	100 U	n/a
chromium	5.3	5.7	7.3

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] No [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 10/9/10
Sr. Review/Date Chris Ricardi 11/15/10
Lab Report # 360-29952-1
Project # 6107/0006.12

ammonia, chloride, sulfate, specific conductance

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☐ *Address* ☐ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

✓ Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ N/A Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 <u>Holding Times</u> Yes [ ] **No [✓]** N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days Sulfide, TDS, TSS = 7 days pH = analyze immediately Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes [✓]** No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ QAPP/IRSWP ☐ Lab? **Yes** [ ] No [ ] N/A [ ] Comments: Spec cond lab report limit is 1 umhos/cm.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness *☐ = 2 mg/L
Spec. Cond.** ☒ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: Ammonia MS/MSD analysis performed on sample OC-PZ17RR (360-29918-7).

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [✓] **No** [ ] N/A [ ] Comments:

Ammonia MS/MSD %R (-29 + -108) less than lower limit. Unspiked sample result greater than four times spike

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes [✓] **No** [ ] N/A [ ] Comments:

See 6.4 above.

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

***NOTE**: MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Field duplicate set OC-GW 2025 (360-29918-3) and OC-GW 2025 DUP (360-29920-4).

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments:

Analyte	ORIG	DUP	RPD
specific conductance	1300	1300	0
ammonia	70	62	12
chloride	65	66	1.5
sulfate	490	490	0

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 10/26/10
Sr. Review/Date Chris Ricondi 11/15/10
Lab Report # 360-29919-1
Project # 610710000.12

total /dissolved - aluminum, chromium, sodium

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☐ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC*.

ACTION: If no, contact lab for submission of copy of completed *COC*.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments: total Chromium (2.48 µg/L) was reported in the method blank. At 5x (12.4 µg/L), result for total chromium in sample OC-ISCO3 (360-29919-4) was less than the action level and was qualified non-detect (U). (BC)

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	MADEP % Rec
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected?~~ analyzed? (10/7/10) List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: MS for total Al, Cr, Na performed on sample OC-PZ18RSW (360-29[illegible])

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: MSD not analyzed.

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [ ]** No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

(initials) 10/2/10 ~~Total and~~ dissolved aluminum and sodium in sample OC-ISCO1 (360-29919-2) and sodium in sample OC-ISCO3 (360-29919-4) were > than total fraction. Results for aluminum and sodium in sample OC-ISCO1 and sodium in sample OC-ISCO3 were qualified estimated (J). (TD).

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [/] No [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [illegible] 10/21/10
Sr. Review/Date Chris Ricordi 11/15/10
Lab Report # 360-29919-1
Project # 610710000616.12

specific conductance, nitrate, nitrite, chloride, sulfate, ammonia.

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

- ☑ Field ID and Lab ID (NA)
- ☑ Date and time collected
- ☑ Analyst Initials
- ☑ Dilution Factor
- ☑ % moisture or solids (NA)
- ☐ Reporting limits ✓
- ☑ *Clean-up method* ✓
- ☑ Analysis method
- ☑ Preparation method
- ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
- ☑ Matrix
- ☑ Target analytes and concentrations
- ☐ Units (soils must be reported in dry weight) ✓

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- ☑ Method blank results
- ☐ LCS recoveries ✓
- ☐ MS/MSD recoveries and RPDs (NA)
- ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [✓] **No** [✓] N/A [ ] Comments: Due to a lab error, sample OC-PZ 17RRSW was analyzed 3 hours beyond technical hold time for nitrate. The result was qualified estimated (J)(HT)

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [ ] No [✓] N/A [ ] Comments:

lab's QL for spec cond 1 µmhos/cm

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☑ = .05 mg/L	Nitrite Nitrogen as N* ☑ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness *☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☑ = 80-120%	Nitrite Nitrogen as N** ☑ = 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [ ] No [✓] N/A [ ] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [ ] No [ ] N/A [✓] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result; SR = Sample result

SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result, D = MSD result

Yes [ ] **No** [ ] N/A [✓] Comments:

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

***NOTE**: MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] No [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 10/9/10
Sr. Review/Date Chris Ricard 11/12/10
Lab Report # 360-30036-1
Project # 60071000.16.12

total/dissolved aluminum, chromium, sodium.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC*.

ACTION: If no, contact lab for submission of copy of completed *COC*.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [ ] No [✓] N/A [ ] Comments: temp 0.0°C. not frozen.

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [✓] **No** [ ] N/A [ ] Comments: Sample temp 0.0°C, not frozen.

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [ ] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the **Yes [✓]** No [ ] N/A [ ] Comments:
☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked. ✓ 10/7/10

Yes [✓] No [ ] N/A [ ] Comments: Sept OC-501 JSW

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

total sodium (74)
dissolved sodium (69)
unspiked > 4x spike, no action

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: NO MSD.

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 **Special QA/QC**

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [✓] **No** [ ] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

Diss. sodium > 10% > Total sodium

T 99,000

D 120,000

% 21 estimate sodium data (J)

(TJ)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] No [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 10/7/10
Sr. Review/Date Chris Ricardi 11/15/10
Lab Report # 360-30036-1
Project # 6107100016.12

specific conductance, chloride, nitrate, nitrite, sulfate, ammonia.

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☐ *Sample identification – Field and Laboratory*

Client Information: ☐ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] No [ ] N/A [ ] Comments:

☐ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [✓] N/A [ ] Comments: temp 0.0°C not frozen.

☒ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

✓ Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

✓ Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [✓] **No** [ ] N/A [ ] Comments: temp 0.0°C not frozen.

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Date and time collected
- [✓] Analyst Initials
- [✓] Dilution Factor
- [N/A] % moisture or solids
- [✓] Reporting limits
- [✓] *Clean-up method*
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [N/A] MS/MSD recoveries and RPDs
- [N/A] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days; Sulfide, TDS, TSS = 7 days; pH = analyze immediately; ✓ Nitrate nitrogen as N = 48 hrs

✓ Nitrite nitrogen as N = 48 hrs; ✗ Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [ ] No [✓] N/A [ ] Comments: Spec cond limits/cm

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☑ = .05 mg/L	Nitrite Nitrogen as N* ☑ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☒ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☑ = 80-120%	Nitrite Nitrogen as N** ☑ = 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [__] No [✓] N/A [__] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [__] No [__] N/A [✓] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [__] No [__] N/A [✓] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [__] **No** [__] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes [ ] **No** [ ] N/A [✓] Comments:

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [✓] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

***NOTE**: MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [ ] No [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FILE COPY

ANALYTICAL REPORT

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:
10/8/10

Job Number: 360-29918-1

Job Description: Olin Chemical Groundwater

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

Approved for release.
James T Wickham
Technology Manager
9/22/2010 1:52 PM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/22/2010

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TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-29918-1**

Project Location: **Olin Chemical Groundwater** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s)):

360-29918-[1-9]

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

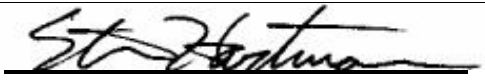
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[X] Yes [ ] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 9/22/10 12:54

CASE NARRATIVE

Client: Olin Corporation

Project: Olin Chemical Groundwater

Report Number: 360-29918-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 09/01/2010; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0, 9.0 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2 C of the required temperature or method specified range. For samples with a specified temperature of 4 C, samples with a temperature ranging from just above freezing temperature of water to 6 C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

DISSOLVED METALS

Samples OC-GW 79S (360-29918-1), OC-GW 202D (360-29918-2), OC-GW 202S (360-29918-3), OC-GW 202S DUP (360-29918-4), OC-PZ 18R (360-29918-5), OC-PZ 16RR (360-29918-6), OC-PZ 17RR (360-29918-7), OC-GW 78S (360-29918-8) and OC-GW 25 (360-29918-9) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 09/08/2010.

General method information:

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-GW 79S (360-29918-1), OC-GW 202D (360-29918-2), OC-GW 202S (360-29918-3), OC-GW 202S DUP (360-29918-4), OC-PZ 18R (360-29918-5), OC-PZ 16RR (360-29918-6), OC-PZ 17RR (360-29918-7), OC-GW 78S (360-29918-8) and OC-GW 25 (360-29918-9) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 09/08/2010.

General method information:

Samples OC-GW 79S (360-29918-1)[10X], OC-GW 202D (360-29918-2)[10X] and OC-PZ 16RR (360-29918-6)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

ANIONS

Samples OC-GW 79S (360-29918-1), OC-GW 202D (360-29918-2), OC-GW 202S (360-29918-3), OC-GW 202S DUP (360-29918-4), OC-PZ 18R (360-29918-5), OC-PZ 16RR (360-29918-6), OC-PZ 17RR (360-29918-7), OC-GW 78S (360-29918-8) and OC-GW 25 (360-29918-9) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 09/08/2010, 09/09/2010 and 09/16/2010.

General method information:

Samples OC-GW 79S (360-29918-1)[10X], OC-GW 202D (360-29918-2)[10X], OC-GW 202D (360-29918-2)[20X], OC-GW 202S (360-29918-3)[10X], OC-GW 202S DUP (360-29918-4)[10X], OC-PZ 18R (360-29918-5)[10X], OC-PZ 16RR (360-29918-6)[10X], OC-PZ 17RR (360-29918-7)[10X], OC-GW 78S (360-29918-8)[10X] and OC-GW 25 (360-29918-9)[10X] required dilution prior to analysis. The

reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-GW 79S (360-29918-1), OC-GW 202D (360-29918-2), OC-GW 202S (360-29918-3), OC-GW 202S DUP (360-29918-4), OC-PZ 18R (360-29918-5), OC-PZ 16RR (360-29918-6), OC-PZ 17RR (360-29918-7), OC-GW 78S (360-29918-8) and OC-GW 25 (360-29918-9) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 09/02/2010 and 09/03/2010 and analyzed on 09/03/2010, 09/09/2010 and 09/21/2010.

Ammonia failed the recovery criteria low for the MS/MSD of sample OC-PZ 17RRMS (360-29918-7) in batch 360-62812.The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. Refer to the QC report for details.

General method information:

Samples OC-GW 79S (360-29918-1)[10X], OC-GW 202D (360-29918-2)[50X], OC-GW 202S (360-29918-3)[10X], OC-GW 202S DUP (360-29918-4)[10X], OC-PZ 18R (360-29918-5)[10X], OC-PZ 16RR (360-29918-6)[10X], OC-PZ 17RR (360-29918-7)[10X], OC-GW 78S (360-29918-8)[10X] and OC-GW 25 (360-29918-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-29918-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
360-29918-1	**OC-GW 79S**				
Sulfate		830	20	mg/L	300.0
Chloride		200	10	mg/L	300.0
Ammonia		120	1.0	mg/L	L107-06-1B
Specific Conductance		2700	10	umhos/cm	SM 2510B
Dissolved					
Chromium		23	5.0	ug/L	6010B
360-29918-2	**OC-GW 202D**				
Sulfate		1900	40	mg/L	300.0
Chloride		230	10	mg/L	300.0
Ammonia		240	5.0	mg/L	L107-06-1B
Specific Conductance		4700	10	umhos/cm	SM 2510B
Dissolved					
Aluminum		13000	100	ug/L	6010B
Chromium		1000	5.0	ug/L	6010B
360-29918-3	**OC-GW 202S**				
Sulfate		490	20	mg/L	300.0
Chloride		65	10	mg/L	300.0
Ammonia		70	1.0	mg/L	L107-06-1B
Specific Conductance		1300	1.0	umhos/cm	SM 2510B
Dissolved					
Chromium		5.3	5.0	ug/L	6010B
360-29918-4	**OC-GW 202S DUP**				
Sulfate		490	20	mg/L	300.0
Chloride		66	10	mg/L	300.0
Ammonia		62	1.0	mg/L	L107-06-1B
Specific Conductance		1300	1.0	umhos/cm	SM 2510B
Dissolved					
Chromium		5.7	5.0	ug/L	6010B

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-29918-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
360-29918-5	**OC-PZ 18R**					
Sulfate		170		20	mg/L	300.0
Chloride		190		10	mg/L	300.0
Ammonia		52		1.0	mg/L	L107-06-1B
Specific Conductance		1200		1.0	umhos/cm	SM 2510B
Dissolved						
Chromium		12		5.0	ug/L	6010B
360-29918-6	**OC-PZ 16RR**					
Sulfate		520		20	mg/L	300.0
Chloride		250		10	mg/L	300.0
Ammonia		100		1.0	mg/L	L107-06-1B
Specific Conductance		2300		10	umhos/cm	SM 2510B
Dissolved						
Chromium		2.1	J	5.0	ug/L	6010B
360-29918-7	**OC-PZ 17RR**					
Sulfate		510		20	mg/L	300.0
Chloride		20		10	mg/L	300.0
Ammonia		59		1.0	mg/L	L107-06-1B
Specific Conductance		1300		1.0	umhos/cm	SM 2510B
Dissolved						
Chromium		4.4	J	5.0	ug/L	6010B
360-29918-8	**OC-GW 78S**					
Sulfate		590		20	mg/L	300.0
Chloride		24		10	mg/L	300.0
Ammonia		41		1.0	mg/L	L107-06-1B
Specific Conductance		1300		1.0	umhos/cm	SM 2510B
Dissolved						
Chromium		2.5	J	5.0	ug/L	6010B

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-29918-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
360-29918-9	**OC-GW 25**					
Sulfate		100		20	mg/L	300.0
Chloride		100		10	mg/L	300.0
Ammonia		44		0.50	mg/L	L107-06-1B
Specific Conductance		720		1.0	umhos/cm	SM 2510B
Dissolved						
Chromium		2.5	J	5.0	ug/L	6010B

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-29918-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-29918-1

Method	Analyst	Analyst ID
SW846 6010B	Smith, Tim J	TJS
40CFR136A 300.0	Emerich, Rich W	RWE
40CFR136A 300.0	Hartmann, Steve	SH
40CFR136A 300.0	Smith, Tim J	TJS
LACHAT L107-06-1B	Emerich, Rich W	RWE
SM SM 2510B	Emerich, Rich W	RWE
SM SM 2510B	Stewart, Alyse M	AMS

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-29918-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-29918-1	OC-GW 79S	Water	08/30/2010 1335	09/01/2010 1700
360-29918-2	OC-GW 202D	Water	08/31/2010 0905	09/01/2010 1700
360-29918-3	OC-GW 202S	Water	08/31/2010 0955	09/01/2010 1700
360-29918-4	OC-GW 202S DUP	Water	08/31/2010 1000	09/01/2010 1700
360-29918-5	OC-PZ 18R	Water	08/31/2010 1130	09/01/2010 1700
360-29918-6	OC-PZ 16RR	Water	08/31/2010 1325	09/01/2010 1700
360-29918-7	OC-PZ 17RR	Water	09/01/2010 1000	09/01/2010 1700
360-29918-8	OC-GW 78S	Water	09/01/2010 1135	09/01/2010 1700
360-29918-9	OC-GW 25	Water	09/01/2010 0845	09/01/2010 1700

SAMPLE RESULTS

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 79S**

Lab Sample ID: 360-29918-1
Client Matrix: Water

Date Sampled: 08/30/2010 1335
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1128			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	23		1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 202D**

Lab Sample ID: 360-29918-2
Client Matrix: Water

Date Sampled: 08/31/2010 0905
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1139			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	13000		15	100
Chromium	1000		1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 202S**

Lab Sample ID: 360-29918-3
Client Matrix: Water

Date Sampled: 08/31/2010 0955
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1149			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	5.3		1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 202S DUP**

Lab Sample ID: 360-29918-4
Client Matrix: Water

Date Sampled: 08/31/2010 1000
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896	Instrument ID: Varian ICP
Preparation:	N/A		Lab File ID: 090810a.csv
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	09/08/2010 1152		Final Weight/Volume: 1.0 mL
Date Prepared:			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	5.7		1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-PZ 18R**

Lab Sample ID: 360-29918-5
Client Matrix: Water

Date Sampled: 08/31/2010 1130
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1155			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	12		1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-PZ 16RR**

Lab Sample ID: 360-29918-6
Client Matrix: Water

Date Sampled: 08/31/2010 1325
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1157			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	2.1	J	1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-PZ 17RR**

Lab Sample ID: 360-29918-7
Client Matrix: Water

Date Sampled: 09/01/2010 1000
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1200			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	4.4	J	1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 78S**

Lab Sample ID: 360-29918-8
Client Matrix: Water

Date Sampled: 09/01/2010 1135
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1203			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	2.5	J	1.0	5.0

Client: Olin Corporation

Job Number: 360-29918-1

Client Sample ID: **OC-GW 25**

Lab Sample ID: 360-29918-9
Client Matrix: Water

Date Sampled: 09/01/2010 0845
Date Received: 09/01/2010 1700

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896	Instrument ID: Varian ICP
Preparation:	N/A		Lab File ID: 090810a.csv
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	09/08/2010 1206		Final Weight/Volume: 1.0 mL
Date Prepared:			

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	2.5	J	1.0	5.0

General Chemistry

Client Sample ID: **OC-GW 79S**

Lab Sample ID: 360-29918-1 Date Sampled: 08/30/2010 1335
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	830		mg/L	20	20	10	300.0
Analysis Batch: 360-63181	Date Analyzed: 09/08/2010 2104						
Chloride	200		mg/L	10	10	10	300.0
Analysis Batch: 360-63181	Date Analyzed: 09/08/2010 2104						
Ammonia	120		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62809	Date Analyzed: 09/03/2010 1447						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	2700		umhos/cm	10	10	10	SM 2510B
Analysis Batch: 360-62942	Date Analyzed: 09/08/2010 1705						

General Chemistry

Client Sample ID: **OC-GW 202D**

Lab Sample ID: 360-29918-2 Date Sampled: 08/31/2010 0905
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	1900		mg/L	40	40	20	300.0
Analysis Batch: 360-63326	Date Analyzed: 09/16/2010 2259						
Chloride	230		mg/L	10	10	10	300.0
Analysis Batch: 360-63181	Date Analyzed: 09/08/2010 2120						
Ammonia	240		mg/L	5.0	5.0	50	L107-06-1B
Analysis Batch: 360-63048	Date Analyzed: 09/09/2010 1403						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	4700		umhos/cm	10	10	10	SM 2510B
Analysis Batch: 360-62942	Date Analyzed: 09/08/2010 1707						

General Chemistry

Client Sample ID: **OC-GW 202S**

Lab Sample ID: 360-29918-3 Date Sampled: 08/31/2010 0955
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	490		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2235						
Chloride	65		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2235						
Ammonia	70		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62809	Date Analyzed: 09/03/2010 1449						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	1300		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1517						

General Chemistry

Client Sample ID: **OC-GW 202S DUP**

Lab Sample ID: 360-29918-4 Date Sampled: 08/31/2010 1000
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	490		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2250						
Chloride	66		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2250						
Ammonia	62		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62809	Date Analyzed: 09/03/2010 1450						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	1300		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1521						

General Chemistry

Client Sample ID: **OC-PZ 18R**

Lab Sample ID: 360-29918-5 Date Sampled: 08/31/2010 1130
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	170		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2305						
Chloride	190		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2305						
Ammonia	52		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62809	Date Analyzed: 09/03/2010 1451						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	1200		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1523						

General Chemistry

Client Sample ID: **OC-PZ 16RR**

Lab Sample ID: 360-29918-6 Date Sampled: 08/31/2010 1325
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	520		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2320						
Chloride	250		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2320						
Ammonia	100		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62809	Date Analyzed: 09/03/2010 1454						
Prep Batch: 360-62759	Date Prepared: 09/02/2010 1500						
Specific Conductance	2300		umhos/cm	10	10	10	SM 2510B
Analysis Batch: 360-62942	Date Analyzed: 09/08/2010 1708						

General Chemistry

Client Sample ID: **OC-PZ 17RR**

Lab Sample ID: 360-29918-7 Date Sampled: 09/01/2010 1000
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	510		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2335						
Chloride	20		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2335						
Ammonia	59		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1459						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	1300		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1526						

General Chemistry

Client Sample ID: **OC-GW 78S**

Lab Sample ID: 360-29918-8 Date Sampled: 09/01/2010 1135
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	590		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2351						
Chloride	24		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/08/2010 2351						
Ammonia	41		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1502						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	1300		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1527						

General Chemistry

Client Sample ID: **OC-GW 25**

Lab Sample ID: 360-29918-9 Date Sampled: 09/01/2010 0845
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	100		mg/L	20	20	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/09/2010 0006						
Chloride	100		mg/L	10	10	10	300.0
Analysis Batch: 360-63190	Date Analyzed: 09/09/2010 0006						
Ammonia	44		mg/L	0.50	0.50	5.0	L107-06-1B
Analysis Batch: 360-63430	Date Analyzed: 09/21/2010 1438						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	720		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1529						

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-29918-1

Lab Section	Qualifier	Description
Metals		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-29918-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-62896					
LCS 360-62896/13	Lab Control Sample	T	Water	6010B	
LCSD 360-62896/26	Lab Control Sample Duplicate	T	Water	6010B	
MB 360-62896/14	Method Blank	T	Water	6010B	
360-29918-1	OC-GW 79S	D	Water	6010B	
360-29918-1DU	Duplicate	D	Water	6010B	
360-29918-1MS	Matrix Spike	D	Water	6010B	
360-29918-1SD	Serial Dilution	D	Water	6010B	
360-29918-2	OC-GW 202D	D	Water	6010B	
360-29918-3	OC-GW 202S	D	Water	6010B	
360-29918-4	OC-GW 202S DUP	D	Water	6010B	
360-29918-5	OC-PZ 18R	D	Water	6010B	
360-29918-6	OC-PZ 16RR	D	Water	6010B	
360-29918-7	OC-PZ 17RR	D	Water	6010B	
360-29918-8	OC-GW 78S	D	Water	6010B	
360-29918-9	OC-GW 25	D	Water	6010B	

Report Basis

D = Dissolved

T = Total

Client: Olin Corporation

Job Number: 360-29918-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-62759					
LCS 360-62759/2-A	Lab Control Sample	T	Water	Distill/Ammonia	
MB 360-62759/1-A	Method Blank	T	Water	Distill/Ammonia	
360-29918-1	OC-GW 79S	T	Water	Distill/Ammonia	
360-29918-2	OC-GW 202D	T	Water	Distill/Ammonia	
360-29918-3	OC-GW 202S	T	Water	Distill/Ammonia	
360-29918-4	OC-GW 202S DUP	T	Water	Distill/Ammonia	
360-29918-5	OC-PZ 18R	T	Water	Distill/Ammonia	
360-29918-6	OC-PZ 16RR	T	Water	Distill/Ammonia	
Prep Batch: 360-62783					
LCS 360-62783/2-A	Lab Control Sample	T	Water	Distill/Ammonia	
MB 360-62783/1-A	Method Blank	T	Water	Distill/Ammonia	
360-29918-7	OC-PZ 17RR	T	Water	Distill/Ammonia	
360-29918-7MS	Matrix Spike	T	Water	Distill/Ammonia	
360-29918-7MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-29918-8	OC-GW 78S	T	Water	Distill/Ammonia	
360-29918-9	OC-GW 25	T	Water	Distill/Ammonia	
Analysis Batch:360-62809					
LCS 360-62759/2-A	Lab Control Sample	T	Water	L107-06-1B	360-62759
MB 360-62759/1-A	Method Blank	T	Water	L107-06-1B	360-62759
360-29918-1	OC-GW 79S	T	Water	L107-06-1B	360-62759
360-29918-3	OC-GW 202S	T	Water	L107-06-1B	360-62759
360-29918-4	OC-GW 202S DUP	T	Water	L107-06-1B	360-62759
360-29918-5	OC-PZ 18R	T	Water	L107-06-1B	360-62759
360-29918-6	OC-PZ 16RR	T	Water	L107-06-1B	360-62759
Analysis Batch:360-62812					
LCS 360-62783/2-A	Lab Control Sample	T	Water	L107-06-1B	360-62783
MB 360-62783/1-A	Method Blank	T	Water	L107-06-1B	360-62783
360-29918-7	OC-PZ 17RR	T	Water	L107-06-1B	360-62783
360-29918-7MS	Matrix Spike	T	Water	L107-06-1B	360-62783
360-29918-7MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-62783
360-29918-8	OC-GW 78S	T	Water	L107-06-1B	360-62783
Analysis Batch:360-62904					
LCS 360-62904/1	Lab Control Sample	T	Water	SM 2510B	
MB 360-62904/4	Method Blank	T	Water	SM 2510B	
360-29918-3	OC-GW 202S	T	Water	SM 2510B	
360-29918-4	OC-GW 202S DUP	T	Water	SM 2510B	
360-29918-5	OC-PZ 18R	T	Water	SM 2510B	
360-29918-7	OC-PZ 17RR	T	Water	SM 2510B	
360-29918-8	OC-GW 78S	T	Water	SM 2510B	
360-29918-9	OC-GW 25	T	Water	SM 2510B	

Client: Olin Corporation Job Number: 360-29918-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-62942					
LCS 360-62942/3	Lab Control Sample	T	Water	SM 2510B	
MB 360-62942/2	Method Blank	T	Water	SM 2510B	
360-29918-1	OC-GW 79S	T	Water	SM 2510B	
360-29918-2	OC-GW 202D	T	Water	SM 2510B	
360-29918-6	OC-PZ 16RR	T	Water	SM 2510B	
Analysis Batch:360-63048					
360-29918-2	OC-GW 202D	T	Water	L107-06-1B	360-62759
Analysis Batch:360-63181					
LCS 360-63181/4	Lab Control Sample	T	Water	300.0	
MB 360-63181/3	Method Blank	T	Water	300.0	
360-29918-1	OC-GW 79S	T	Water	300.0	
360-29918-2	OC-GW 202D	T	Water	300.0	
Analysis Batch:360-63190					
LCS 360-63190/4	Lab Control Sample	T	Water	300.0	
MB 360-63190/3	Method Blank	T	Water	300.0	
360-29918-3	OC-GW 202S	T	Water	300.0	
360-29918-4	OC-GW 202S DUP	T	Water	300.0	
360-29918-5	OC-PZ 18R	T	Water	300.0	
360-29918-6	OC-PZ 16RR	T	Water	300.0	
360-29918-7	OC-PZ 17RR	T	Water	300.0	
360-29918-8	OC-GW 78S	T	Water	300.0	
360-29918-9	OC-GW 25	T	Water	300.0	
Analysis Batch:360-63326					
LCS 360-63326/4	Lab Control Sample	T	Water	300.0	
MB 360-63326/3	Method Blank	T	Water	300.0	
360-29918-2	OC-GW 202D	T	Water	300.0	
Analysis Batch:360-63430					
360-29918-9	OC-GW 25	T	Water	L107-06-1B	360-62783

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-62896

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-62896/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1052
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-62896

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-62896/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1049
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-62896/26
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1142
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	96	80 - 120	4	20		
Chromium	99	96	80 - 120	4	20		

Client: Olin Corporation

Job Number: 360-29918-1

Matrix Spike - Batch: 360-62896

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-29918-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1131
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	ND	5000	6040	121	75 - 125	
Chromium	23	1000	1130	110	75 - 125	

Duplicate - Batch: 360-62896

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-29918-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1134
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	ND	ND	NC	20	
Chromium	23	22.4	5	20	

Serial Dilution - Batch: 360-62896

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-29918-1
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/08/2010 1137
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	%Diff	Limit	Qual
Aluminum	ND	ND	NC	10	
Chromium	23	24.4	NC	10	J

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-63181

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63181/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1532
Date Prepared: N/A

Analysis Batch: 360-63181
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63181

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63181/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1547
Date Prepared: N/A

Analysis Batch: 360-63181
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.8	101	85 - 115	
Chloride	40.0	39.4	99	85 - 115	

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-63190

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63190/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 2205
Date Prepared: N/A

Analysis Batch: 360-63190
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63190

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63190/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 2220
Date Prepared: N/A

Analysis Batch: 360-63190
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	81.5	102	85 - 115	
Chloride	40.0	39.1	98	85 - 115	

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-63326

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63326/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/16/2010 1727
Date Prepared: N/A

Analysis Batch: 360-63326
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63326

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63326/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/16/2010 1742
Date Prepared: N/A

Analysis Batch: 360-63326
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.2	100	85 - 115	
Chloride	40.0	39.0	97	85 - 115	

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-62759

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-62759/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1407
Date Prepared: 09/02/2010 1500

Analysis Batch: 360-62809
Prep Batch: 360-62759
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Sample - Batch: 360-62759

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-62759/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1408
Date Prepared: 09/02/2010 1500

Analysis Batch: 360-62809
Prep Batch: 360-62759
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.45	95	85 - 115	

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-62783/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1431
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Sample - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-62783/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1432
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.27	93	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-29918-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 09/03/2010 1500
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-29918-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 09/03/2010 1501
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	-29	-108	75 - 125	15	20	4	4

OK

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-62904

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-62904/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1437
Date Prepared: N/A

Analysis Batch: 360-62904
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090800.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Sample - Batch: 360-62904

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-62904/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1414
Date Prepared: N/A

Analysis Batch: 360-62904
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090800.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	98	85 - 115	

Client: Olin Corporation

Job Number: 360-29918-1

Method Blank - Batch: 360-62942

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-62942/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1701
Date Prepared: N/A

Analysis Batch: 360-62942
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090801.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Sample - Batch: 360-62942

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-62942/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1702
Date Prepared: N/A

Analysis Batch: 360-62942
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090801.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	99	85 - 115	

State Accreditation Matrix

Method Name	Description	State where Primary Accreditation is Carried				
		New Hampshire (NELAC) prim.	Mass	Conn	Florida (NELAC)	North Carolina
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP			NP	
SM 4500 Cl F	Chlorine, Residual		NP			
SM 9215E	Heterotrophic Plate Count (SimPlate)		P			
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP			
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P			
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P			
1103.1	E.coli		ambient/ source			
Enterolert	Enterococcus					
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	NP/P		
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	NP/P		
6010B	Metals (ICP)(list upon request)	NP/SW		NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	NP/P		
7470A	Mercury (CVAA)	NP		NP		
7471A	Mercury (CVAA)	SW		SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	NP/P		
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		NP/P		
3010A	Preparation, Total Metals	NP/P		NP/P		
3020A	Preparation, Total Metals	NP/P/SW		NP/P/SW		
3050B	Preparation, Metals	SW		SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	P		
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	NP		
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP		NP		
3546	Microwave Extraction	SW				
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		NP		
3540C	Soxhlet Extraction	SW				
3550B	Ultrasonic Extraction	SW		SW		
600/4-81-045	Polychlorinated Biphenyls (PCBs) (GC)		NP	NP		
8081A	Organochlorine Pesticides (GC)(list upon request)	NP/SW		NP/SW		
8082A	PCBs by Gas Chromatography(list upon request)	NP/SW		NP/SW		
8270C	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)			NP/SW		
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	P		
524.2	Trihalomethane compounds	P	P	P		
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	NP		
5035	Closed System Purge and Trap	SW		SW		
5030B	Purge and Trap	NP		NP		
8260B	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
180.1	Turbidity, Nephelometric	P	P	P		
300	Anions, Ion Chromatography	NP/P	NP/P	NP/P		
410.4	COD	NP	NP	NP		
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	NP		
7196A	Chromium, Hexavalent	NP/SW		NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		NP		
9040B	pH	NP		NP		
9045C	pH	SW		SW		
L107041C	Nitrogen, Nitrate	NP	P	NP/P		
L107-06-1B	Nitrogen Ammonia	NP	NP	NP/P		
L204001A CN	Cyanide, Total	P	NP/P	NP/P		
L210-001A	Phenolics, Total Recoverable	NP	NP	NP		
SM 2320B	Alkalinity	NP/P	NP/P	NP/P		
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	NP/P		
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	NP/P		
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	NP		
SM 3500 CR D	Chromium, Hexavalent	NP		NP		
SM 4500 H+ B	pH	NP/P	NP/P	NP/P		
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	NP/P		
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	NP/P		
SM 4500 P E	Phosphorus, Total	NP	NP	NP		
SM 4500 S2 D	Sulfide, Total	NP		NP		
SM 5210B	BOD, 5-Day	NP	NP	NP		
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	NP/P		

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-29918-1

Login Number: 29918

List Source: TestAmerica Westfield

Creator: Beaumier, Janine E

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	9.0C
Cooler Temperature is recorded.	True	3.0C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

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Chain of Custody Form

007193

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707
Westfield

•240 Bear Hill Rd., Suite 104
Waltham, MA 02451
(P) 781-466-6900
(F) 781-466-6901
Boston - Service Center

Client: olin Corporation
Address: 51 Eames St
wilmington MA 01887
Phone: 9786586121 Fax: Same

Client Project #:
Site ID & State:
Reports Sent To: stevemorrow/Brian Guichard
Email: beguichard@olin.com Email Rpt: ☐

Job#: 360-29918 Quote#: PO#:
Shaded areas for office use
Invoice same as Report to? ☐
If Invoice contact or address different, note in *Comments*

Comments
(Special Instructions)

Please print legibly. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD ______ RUSH ______
(Lab Approval Required)

Regulatory Programs/Presumptive Certainty/QC Forms
MADEP MCP ☐ GW1/S1 ☐ PWS DEP Forms ☐
CTDEP RCP ☐ CT RSR ☐ EDD Required ☐
Std Rpt (L1) ☐ Rpt + QC(L2./MCP ☐ CLP Rpt (L3 or L4) ☐

500-series for drinking water
600-series for wastewater, NPDES
6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define.

Sample Type Codes: WW-Wastewater, DW-Drinking Water, SW-Surface Water, GW-Groundwater, LW Lab Water, A-Air, S-Solids/Soil O-Oil, "Z"- Other

Sample I.D.	Sample Type	Sampler's Initials	Date Time Collected	pH ✓ (lab use only)	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	Na2S2O3	None / 4° C	524 / 624 / 8260	525 / 625 / 8270	PCB / Pest / Herbicide	EPH / VPH	DRO / GRO / ETPH	Metals (Please Specify)	Mercury	General Chemistry	Bacteriological	Toxicity	Diss Al/Cr 6010B	Specific Cond	chloride Sulfate	Ammonia-nitrogen
GW 79S	GW	BG	8/30/10 135		X		3	P		1	1				1											X	X	X	X
GW 202D	GW	BG	8/31/10 905		X		3	P		1	1				1											X	X	X	X
GW 202S	GW	BG	8/31/10 9:55		X		3	P		1	1				1											X	X	X	X
GW	GW	BG	8/31/10		X		3	P		1	1				1											X	X	X	X
GW 202S Dup	GW	BG	8/31/10 10:00		X		3	P		1	1				1											X	X	X	X
PZ 18R	GW	BG	8/31/10 11:30		X		3	P		1	1				1											X	X	X	X
PZ 16RR	GW	BG	8/31/10		X		3	P		1	1				1											X	X	X	X
PZ 17RR	GW	BG	9/1/10 10:00		X		3	P		1	1				1											X	X	X	X
GW 78S	GW	BG	9/1/10 11:35		X		3	P		1	1				1											X	X	X	X
GW 2S	GW	BG	9/1/10 8:45		X		3	P		1	1				1											X	X	X	X

Sampled by (print): BRIAN Guichard
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	9/1/10	3:00	[signature]	9-1-10	1505
[signature]	9-1-10	1700	[signature]	9/1/10	14:00

Cooler? (Y) N
MADEP Requirement Samples Iced? (Y) N
Temp @ receipt: 3.0/9.0 °C
Preservation / pH checked? (Y) N
By: JB Date: 9/1/10

TestAmerica Westfield

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Chain of Custody Form

007194

•53 Southampton Road, Westfield, MA 01085, (P) 413-572-4000, (F) 413-572-3707 — **Westfield**

•240 Bear Hill Rd., Suite 104, Waltham, MA 02451, (P) 781-466-6900, (F) 781-466-6901 — **Boston - Service Center**

Client: olin Corporation
Address: 51 eames st, wilmington MA 0887
Phone: 9786586121 Fax: None

Client Project #:
Site ID & State:
Reports Sent To: steve morrow / Brian Guichard
Email: beguichard@olin.com Email Rpt: ☐

Job#: 360-29918 Quote#: PO#:

Shaded areas for office use

Invoice same as Report to? ☐
If Invoice contact or address different, note in Comments

Comments (Special Instructions)

Please print legibly. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD ____ RUSH ____ (Lab Approval Required)

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MADEP MCP ☐ GW1/S1 ☐ PWS DEP Forms ☐
CTDEP RCP ☐ CT RSR ☐ EDD Required ☐
Std Rpt (L1) ☐ Rpt + QC(L2./MCP ☐ CLP Rpt (L3 or L4) ☐

500-series for drinking water
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6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define.

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GW 16	GW	BG	9/1/10 705				11	P/G		1		7			3	X										X	X	X 8270C NDMA/BeHp; X VPH(MAVPH); X PH by SM 4500 H+B

JB 9/1/10

Sampled by (print): Brian Guichard
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	9/1/10	3:00	Jerry [signature]	9-1-10	1505
Jerry [signature]	9-1-10	1700	[signature] Beaudry	9/1/10	17:00

Cooler? (Y) N
MADEP Requirement Samples Iced? (Y) N
Temp @ receipt: 3.0/9.0 °C
Preservation / pH checked? (Y) N
By: JB Date: 9/1/10

TestAmerica Westfield

Page 2 of 2

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THE LEADER IN ENVIRONMENTAL TESTING

FILE COPY

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

10/7/10

ANALYTICAL REPORT

Job Number: 360-29919-1

Job Description: Olin Chemical Quarterly Surfacewater

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

Approved for release.
Joe Chimi
Report Production Representative
9/16/10 4:41 PM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/16/2010

Results relate only to the items tested and the sample(s) as received by the laboratory. The test results in this report meet all NELAC requirements for accredited parameters, exceptions are noted in this report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY ELAP 10843, North Carolina 647, NELAP PA 68-04386. Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002.

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

MassDEP Analytical Protocol Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-29919-1**
Project Location:		RTN:	

This form provides certifications for the following data set: list Laboratory Sample ID Number(s)):

360-29919-(1-6)

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

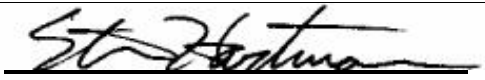
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[X] Yes [ ] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:		Position:	Laboratory Director
Printed Name:	Steven C. Hartmann	Date:	9/16/10 16:34

CASE NARRATIVE

Client: Olin Corporation

Project: Olin Chemical Quarterly Surfacewater

Report Number: 360-29919-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 09/01/2010; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2 C of the required temperature or method specified range. For samples with a specified temperature of 4 C, samples with a temperature ranging from just above freezing temperature of water to 6 C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

TOTAL METALS (ICP)
Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 09/02/2010 and analyzed on 09/03/2010.

Chromium was detected in method blank MB 360-62734/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analyses.

All other quality control parameters were within the acceptance limits.

DISSOLVED METALS
Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 09/07/2010 and 09/08/2010.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

ANIONS
Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 09/03/2010.

Due to a sample management error, sample OC-PZ 17 RR SW (360-29919-6) was analyzed outside of holding time for Nitrate.

Samples OC-PZ 18 R SW (360-29919-1)[10X], OC-ISCO 1 (360-29919-2)[10X], OC-ISCO 2 (360-29919-3)[10X], OC-ISCO 3 (360-29919-4)[10X], OC-PZ 16 RR SW (360-29919-5)[10X] and OC-PZ 17 RR SW (360-29919-6)[10X] required dilution prior to analysis

due to high target concentration. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 09/03/2010 and analyzed on 09/03/2010 and 09/09/2010.

Samples OC-PZ 18 R SW (360-29919-1)[10X], OC-ISCO 2 (360-29919-3)[10X] and OC-PZ 17 RR SW (360-29919-6)[5X] required dilution prior to analysis due to high concentration. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the ammonia analyses.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 09/08/2010.

Sample OC-ISCO 2 (360-29919-3)[2X] required dilution prior to analysis due to high concentration. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

NITRITE

Samples OC-PZ 18 R SW (360-29919-1), OC-ISCO 1 (360-29919-2), OC-ISCO 2 (360-29919-3), OC-ISCO 3 (360-29919-4), OC-PZ 16 RR SW (360-29919-5) and OC-PZ 17 RR SW (360-29919-6) were analyzed for Nitrogen-Nitrite in accordance with SM20 4500 NO2 B. The samples were analyzed on 09/01/2010.

No difficulties were encountered during the nitrite analyses.

All quality control parameters were within the acceptance limits.

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-29919-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
360-29919-1	**OC-PZ 18 R SW**					
Aluminum		1000		100	ug/L	6010B
Chromium		18	B	5.0	ug/L	6010B
Sodium		55000		2000	ug/L	6010B
Sulfate		200		20	mg/L	300.0
Chloride		64		10	mg/L	300.0
Nitrate as N		0.22		0.050	mg/L	300.0
Ammonia		21		1.0	mg/L	L107-06-1B
Specific Conductance		660		1.0	umhos/cm	SM 2510B
Dissolved						
Aluminum		1100		100	ug/L	6010B
Chromium		12		5.0	ug/L	6010B
Sodium		61000		2000	ug/L	6010B
360-29919-2	**OC-ISCO 1**					
Aluminum		950		100	ug/L	6010B
Chromium		15	B	5.0	ug/L	6010B
Sodium		47000		2000	ug/L	6010B
Sulfate		180		20	mg/L	300.0
Chloride		60		10	mg/L	300.0
Nitrate as N		0.29		0.050	mg/L	300.0
Ammonia		19		0.10	mg/L	L107-06-1B
Specific Conductance		620		1.0	umhos/cm	SM 2510B
Dissolved						
Aluminum		1100		100	ug/L	6010B
Chromium		10		5.0	ug/L	6010B
Sodium		55000		2000	ug/L	6010B
360-29919-3	**OC-ISCO 2**					
Aluminum		360		100	ug/L	6010B
Chromium		65	B	5.0	ug/L	6010B
Sodium		140000		2000	ug/L	6010B
Sulfate		480		20	mg/L	300.0
Chloride		170		10	mg/L	300.0
Nitrate as N		3.1		0.050	mg/L	300.0
Ammonia		63		1.0	mg/L	L107-06-1B
Specific Conductance		1600		2.0	umhos/cm	SM 2510B
Dissolved						
Aluminum		56	J	100	ug/L	6010B
Chromium		13		5.0	ug/L	6010B
Sodium		150000		2000	ug/L	6010B

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-29919-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
360-29919-4	**OC-ISCO 3**					
Aluminum		35	J	100	ug/L	6010B
Chromium		1.8	J B	5.0	ug/L	6010B
Sodium		79000		2000	ug/L	6010B
Sulfate		22		2.0	mg/L	300.0
Chloride		190		10	mg/L	300.0
Nitrate as N		1.0		0.050	mg/L	300.0
Ammonia		0.70		0.10	mg/L	L107-06-1B
Specific Conductance		720		1.0	umhos/cm	SM 2510B
Dissolved						
Sodium		91000		2000	ug/L	6010B
360-29919-5	**OC-PZ 16 RR SW**					
Aluminum		1100		100	ug/L	6010B
Chromium		220	B	5.0	ug/L	6010B
Sodium		140000		2000	ug/L	6010B
Sulfate		180		20	mg/L	300.0
Chloride		250		10	mg/L	300.0
Nitrate as N		5.1		0.050	mg/L	300.0
Ammonia		19		0.10	mg/L	L107-06-1B
Specific Conductance		1200		1.0	umhos/cm	SM 2510B
Dissolved						
Aluminum		69	J	100	ug/L	6010B
Chromium		13		5.0	ug/L	6010B
Sodium		140000		2000	ug/L	6010B
360-29919-6	**OC-PZ 17 RR SW**					
Aluminum		940		100	ug/L	6010B
Chromium		210	B	5.0	ug/L	6010B
Sodium		130000		2000	ug/L	6010B
Sulfate		200		20	mg/L	300.0
Chloride		230		10	mg/L	300.0
Nitrate as N		4.0	H	0.050	mg/L	300.0
Ammonia		25		0.50	mg/L	L107-06-1B
Specific Conductance		1200		1.0	umhos/cm	SM 2510B
Dissolved						
Aluminum		170		100	ug/L	6010B
Chromium		66		5.0	ug/L	6010B
Sodium		140000		2000	ug/L	6010B

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-29919-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Total Metals	TAL WFD	SW846 6010B	
Dissolved Metals	TAL WFD	SW846 6010B	
Preparation, Total Metals	TAL WFD		SW846 3010A
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	
Nitrogen, Nitrite	TAL WFD	SM SM 4500 NO2 B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-29919-1

Method	Analyst	Analyst ID
SW846 6010B	Smith, Tim J	TJS
40CFR136A 300.0	Emerich, Rich W	RWE
LACHAT L107-06-1B	Emerich, Rich W	RWE
SM SM 2510B	Emerich, Rich W	RWE
SM SM 2510B	Stewart, Alyse M	AMS
SM SM 4500 NO2 B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-29919-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-29919-1	OC-PZ 18 R SW	Water	09/01/2010 1205	09/01/2010 1700
360-29919-2	OC-ISCO 1	Water	09/01/2010 1220	09/01/2010 1700
360-29919-3	OC-ISCO 2	Water	09/01/2010 1300	09/01/2010 1700
360-29919-4	OC-ISCO 3	Water	09/01/2010 1325	09/01/2010 1700
360-29919-5	OC-PZ 16 RR SW	Water	09/01/2010 1400	09/01/2010 1700
360-29919-6	OC-PZ 17 RR SW	Water	09/01/2010 1025	09/01/2010 1700

SAMPLE RESULTS

Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: **OC-PZ 18 R SW**

Lab Sample ID: 360-29919-1
Client Matrix: Water

Date Sampled: 09/01/2010 1205
Date Received: 09/01/2010 1700

6010B Total Metals

Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1557			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	1000		15	100
Chromium	18	B	1.0	5.0
Sodium	55000		250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62881		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090710c.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/07/2010 1714			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	1100		15	100
Chromium	12		1.0	5.0
Sodium	61000		250	2000

10/8/10

Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: **OC-ISCO 1**

Lab Sample ID: 360-29919-2
Client Matrix: Water

Date Sampled: 09/01/2010 1220
Date Received: 09/01/2010 1700

6010B Total Metals

Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1617			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	950	J	15	100
Chromium	15	~~B~~	1.0	5.0
Sodium	47000	J	250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62881		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090710c.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/07/2010 1717			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	1100	J	15	100
Chromium	10		1.0	5.0
Sodium	55000	J	250	2000

10/8/10

Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: **OC-ISCO 2**

Lab Sample ID: 360-29919-3
Client Matrix: Water

Date Sampled: 09/01/2010 1300
Date Received: 09/01/2010 1700

6010B Total Metals

Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1620			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	360		15	100
Chromium	65	B	1.0	5.0
Sodium	140000		250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62881		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090710c.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/07/2010 1720			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	56	J	15	100
Chromium	13		1.0	5.0
Sodium	150000		250	2000

10/8/10

Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: OC-ISCO 3

Lab Sample ID: 360-29919-4
Client Matrix: Water

Date Sampled: 09/01/2010 1325
Date Received: 09/01/2010 1700

6010B Total Metals

Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1624			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	35	J	15	100
Chromium	1.8 U	~~J B~~	1.0	5.0
Sodium	79000 J		250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1212			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0
Sodium	91000 J		250	2000

10/8/10

Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: **OC-PZ 16 RR SW**

Lab Sample ID: 360-29919-5
Client Matrix: Water

Date Sampled: 09/01/2010 1400
Date Received: 09/01/2010 1700

6010B Total Metals

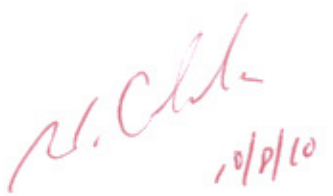
Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1627			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	1100		15	100
Chromium	220	B	1.0	5.0
Sodium	140000		250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1215			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	69	J	15	100
Chromium	13		1.0	5.0
Sodium	140000		250	2000



Client: Olin Corporation

Job Number: 360-29919-1

Client Sample ID: **OC-PZ 17 RR SW**

Lab Sample ID: 360-29919-6
Client Matrix: Water

Date Sampled: 09/01/2010 1025
Date Received: 09/01/2010 1700

6010B Total Metals

Method:	6010B	Analysis Batch: 360-62834		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-62734		Lab File ID:	090310.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/03/2010 1630			Final Weight/Volume:	50 mL
Date Prepared:	09/02/2010 0906				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	940		15	100
Chromium	210	B	1.0	5.0
Sodium	130000		250	2000

6010B Dissolved Metals-Dissolved

Method:	6010B	Analysis Batch: 360-62896		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	090810a.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/08/2010 1223			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	170		15	100
Chromium	66		1.0	5.0
Sodium	140000		250	2000

10/7/10

General Chemistry

Client Sample ID: **OC-PZ 18 R SW**

Lab Sample ID: 360-29919-1 Date Sampled: 09/01/2010 1205
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	200		mg/L	20	20	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1352						
Chloride	64		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1352						
Nitrate as N	0.22		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1151						
Ammonia	21		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1503						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	660		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1530						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

General Chemistry

Client Sample ID: **OC-ISCO 1**

Lab Sample ID: 360-29919-2 Date Sampled: 09/01/2010 1220
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	180		mg/L	20	20	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1437						
Chloride	60		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1437						
Nitrate as N	0.29		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1206						
Ammonia	19		mg/L	0.10	0.10	1.0	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1438						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	620		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1532						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

General Chemistry

Client Sample ID: **OC-ISCO 2**

Lab Sample ID: 360-29919-3 Date Sampled: 09/01/2010 1300
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	480		mg/L	20	20	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1452						
Chloride	170		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1452						
Nitrate as N	3.1		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1221						
Ammonia	63		mg/L	1.0	1.0	10	L107-06-1B
Analysis Batch: 360-63050	Date Analyzed: 09/09/2010 1406						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	1600		umhos/cm	2.0	2.0	2.0	SM 2510B
Analysis Batch: 360-62942	Date Analyzed: 09/08/2010 1710						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

General Chemistry

Client Sample ID: **OC-ISCO 3**

Lab Sample ID: 360-29919-4 Date Sampled: 09/01/2010 1325
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	22		mg/L	2.0	2.0	1.0	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1237						
Chloride	190		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1508						
Nitrate as N	1.0		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1252						
Ammonia	0.70		mg/L	0.10	0.10	1.0	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1442						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	720		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1534						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

General Chemistry

Client Sample ID: **OC-PZ 16 RR SW**

Lab Sample ID: 360-29919-5 Date Sampled: 09/01/2010 1400
Client Matrix: Water Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	180		mg/L	20	20	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1523						
Chloride	250		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1523						
Nitrate as N	5.1		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1252						
Ammonia	19		mg/L	0.10	0.10	1.0	L107-06-1B
Analysis Batch: 360-62812	Date Analyzed: 09/03/2010 1443						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	1200		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1536						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

General Chemistry

Client Sample ID: **OC-PZ 17 RR SW**

Lab Sample ID: 360-29919-6
Client Matrix: Water

Date Sampled: 09/01/2010 1025
Date Received: 09/01/2010 1700

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Sulfate	200		mg/L	20	20	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1538						
Chloride	230		mg/L	10	10	10	300.0
Analysis Batch: 360-63039	Date Analyzed: 09/03/2010 1538						
Nitrate as N	4.0	~~H~~ J	mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63036	Date Analyzed: 09/03/2010 1307						
Ammonia	25		mg/L	0.50	0.50	5.0	L107-06-1B
Analysis Batch: 360-63050	Date Analyzed: 09/09/2010 1407						
Prep Batch: 360-62783	Date Prepared: 09/03/2010 1039						
Specific Conductance	1200		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-62904	Date Analyzed: 09/08/2010 1537						
Nitrite as N	ND		mg/L	0.010	0.010	1.0	SM 4500 NO2
Analysis Batch: 360-62846	Date Analyzed: 09/01/2010 1749						

10/8/10

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-29919-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	H	Sample was prepped or analyzed beyond the specified holding time

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-29919-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-62734					
LCS 360-62734/2-A	Lab Control Sample	T	Water	3010A	
LCSD 360-62734/3-A	Lab Control Sample Duplicate	T	Water	3010A	
MB 360-62734/1-A	Method Blank	T	Water	3010A	
360-29919-1	OC-PZ 18 R SW	T	Water	3010A	
360-29919-1DU	Duplicate	T	Water	3010A	
360-29919-1MS	Matrix Spike	T	Water	3010A	
360-29919-1PDS	Post Digestion Spike	T	Water	3010A	
360-29919-1SD	Serial Dilution	T	Water	3010A	
360-29919-2	OC-ISCO 1	T	Water	3010A	
360-29919-3	OC-ISCO 2	T	Water	3010A	
360-29919-4	OC-ISCO 3	T	Water	3010A	
360-29919-5	OC-PZ 16 RR SW	T	Water	3010A	
360-29919-6	OC-PZ 17 RR SW	T	Water	3010A	
Analysis Batch:360-62834					
LCS 360-62734/2-A	Lab Control Sample	T	Water	6010B	360-62734
LCSD 360-62734/3-A	Lab Control Sample Duplicate	T	Water	6010B	360-62734
MB 360-62734/1-A	Method Blank	T	Water	6010B	360-62734
360-29919-1	OC-PZ 18 R SW	T	Water	6010B	360-62734
360-29919-1DU	Duplicate	T	Water	6010B	360-62734
360-29919-1MS	Matrix Spike	T	Water	6010B	360-62734
360-29919-1PDS	Post Digestion Spike	T	Water	6010B	360-62734
360-29919-1SD	Serial Dilution	T	Water	6010B	360-62734
360-29919-2	OC-ISCO 1	T	Water	6010B	360-62734
360-29919-3	OC-ISCO 2	T	Water	6010B	360-62734
360-29919-4	OC-ISCO 3	T	Water	6010B	360-62734
360-29919-5	OC-PZ 16 RR SW	T	Water	6010B	360-62734
360-29919-6	OC-PZ 17 RR SW	T	Water	6010B	360-62734
Analysis Batch:360-62881					
LCS 360-62881/1	Lab Control Sample	T	Water	6010B	
LCSD 360-62881/5	Lab Control Sample Duplicate	T	Water	6010B	
MB 360-62881/2	Method Blank	T	Water	6010B	
360-29919-1	OC-PZ 18 R SW	D	Water	6010B	
360-29919-2	OC-ISCO 1	D	Water	6010B	
360-29919-3	OC-ISCO 2	D	Water	6010B	
Analysis Batch:360-62896					
LCS 360-62896/13	Lab Control Sample	T	Water	6010B	
LCSD 360-62896/26	Lab Control Sample Duplicate	T	Water	6010B	
MB 360-62896/14	Method Blank	T	Water	6010B	
360-29919-4	OC-ISCO 3	D	Water	6010B	
360-29919-5	OC-PZ 16 RR SW	D	Water	6010B	
360-29919-6	OC-PZ 17 RR SW	D	Water	6010B	

Client: Olin Corporation

Job Number: 360-29919-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-29919-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-62783					
LCS 360-62783/2-A	Lab Control Sample	T	Water	Distill/Ammonia	
MB 360-62783/1-A	Method Blank	T	Water	Distill/Ammonia	
360-29919-1	OC-PZ 18 R SW	T	Water	Distill/Ammonia	
360-29919-2	OC-ISCO 1	T	Water	Distill/Ammonia	
360-29919-3	OC-ISCO 2	T	Water	Distill/Ammonia	
360-29919-4	OC-ISCO 3	T	Water	Distill/Ammonia	
360-29919-5	OC-PZ 16 RR SW	T	Water	Distill/Ammonia	
360-29919-6	OC-PZ 17 RR SW	T	Water	Distill/Ammonia	
Analysis Batch:360-62812					
LCS 360-62783/2-A	Lab Control Sample	T	Water	L107-06-1B	360-62783
MB 360-62783/1-A	Method Blank	T	Water	L107-06-1B	360-62783
360-29919-1	OC-PZ 18 R SW	T	Water	L107-06-1B	360-62783
360-29919-2	OC-ISCO 1	T	Water	L107-06-1B	360-62783
360-29919-4	OC-ISCO 3	T	Water	L107-06-1B	360-62783
360-29919-5	OC-PZ 16 RR SW	T	Water	L107-06-1B	360-62783
Analysis Batch:360-62846					
LCS 360-62846/4	Lab Control Sample	T	Water	SM 4500 NO2 B	
MB 360-62846/3	Method Blank	T	Water	SM 4500 NO2 B	
360-29919-1	OC-PZ 18 R SW	T	Water	SM 4500 NO2 B	
360-29919-2	OC-ISCO 1	T	Water	SM 4500 NO2 B	
360-29919-3	OC-ISCO 2	T	Water	SM 4500 NO2 B	
360-29919-4	OC-ISCO 3	T	Water	SM 4500 NO2 B	
360-29919-5	OC-PZ 16 RR SW	T	Water	SM 4500 NO2 B	
360-29919-6	OC-PZ 17 RR SW	T	Water	SM 4500 NO2 B	
Analysis Batch:360-62904					
LCS 360-62904/1	Lab Control Sample	T	Water	SM 2510B	
MB 360-62904/4	Method Blank	T	Water	SM 2510B	
360-29919-1	OC-PZ 18 R SW	T	Water	SM 2510B	
360-29919-2	OC-ISCO 1	T	Water	SM 2510B	
360-29919-4	OC-ISCO 3	T	Water	SM 2510B	
360-29919-5	OC-PZ 16 RR SW	T	Water	SM 2510B	
360-29919-6	OC-PZ 17 RR SW	T	Water	SM 2510B	
Analysis Batch:360-62942					
LCS 360-62942/3	Lab Control Sample	T	Water	SM 2510B	
MB 360-62942/2	Method Blank	T	Water	SM 2510B	
360-29919-3	OC-ISCO 2	T	Water	SM 2510B	
360-29919-3DU	Duplicate	T	Water	SM 2510B	

Client: Olin Corporation Job Number: 360-29919-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-63036					
LCS 360-63036/4	Lab Control Sample	T	Water	300.0	
MB 360-63036/3	Method Blank	T	Water	300.0	
360-29919-1	OC-PZ 18 R SW	T	Water	300.0	
360-29919-2	OC-ISCO 1	T	Water	300.0	
360-29919-3	OC-ISCO 2	T	Water	300.0	
360-29919-4	OC-ISCO 3	T	Water	300.0	
360-29919-5	OC-PZ 16 RR SW	T	Water	300.0	
360-29919-6	OC-PZ 17 RR SW	T	Water	300.0	
Analysis Batch:360-63039					
LCS 360-63039/4	Lab Control Sample	T	Water	300.0	
MB 360-63039/3	Method Blank	T	Water	300.0	
360-29919-1	OC-PZ 18 R SW	T	Water	300.0	
360-29919-2	OC-ISCO 1	T	Water	300.0	
360-29919-3	OC-ISCO 2	T	Water	300.0	
360-29919-4	OC-ISCO 3	T	Water	300.0	
360-29919-5	OC-PZ 16 RR SW	T	Water	300.0	
360-29919-6	OC-PZ 17 RR SW	T	Water	300.0	
Analysis Batch:360-63050					
LCS 360-62783/2-A	Lab Control Sample	T	Water	L107-06-1B	360-62783
MB 360-62783/1-A	Method Blank	T	Water	L107-06-1B	360-62783
360-29919-3	OC-ISCO 2	T	Water	L107-06-1B	360-62783
360-29919-6	OC-PZ 17 RR SW	T	Water	L107-06-1B	360-62783

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62734

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-62734/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1547
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	2.48	J	1.0	5.0
Sodium	ND		250	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-62734

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-62734/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1551
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-62734/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1554
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	103	106	80 - 120	3	20		
Chromium	104	107	80 - 120	3	20		
Sodium	100	103	80 - 120	3	20		

Client: Olin Corporation

Job Number: 360-29919-1

Matrix Spike - Batch: 360-62734

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-29919-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1609
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	1000	5000	6240	105	75 - 125	
Chromium	18	1000	1050	104	75 - 125	
Sodium	55000	20000	72600	90	75 - 125	

Post Digestion Spike - Batch: 360-62734

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-29919-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1615
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	1000	5000	5930	98	75 - 125	
Chromium	18	1000	990	97	75 - 125	
Sodium	55000	20000	71500	84	75 - 125	

Client: Olin Corporation

Job Number: 360-29919-1

Duplicate - Batch: 360-62734

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-29919-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1600
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	1000	945	7	20	
Chromium	18	15.5	15	20	
Sodium	55000	49100	11	20	

Serial Dilution - Batch: 360-62734

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-29919-1
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/03/2010 1612
Date Prepared: 09/02/2010 0906

Analysis Batch: 360-62834
Prep Batch: 360-62734
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090310.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Result	%Diff	Limit	Qual
Aluminum	1000	1070	5.9	10	
Chromium	18	13.5	NC	10	J
Sodium	55000	56600	3.8	10	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62881

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-62881/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/07/2010 1554
Date Prepared: N/A

Analysis Batch: 360-62881
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090710c.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0
Sodium	ND		250	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-62881

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-62881/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/07/2010 1551
Date Prepared: N/A

Analysis Batch: 360-62881
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090710c.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-62881/5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/07/2010 1647
Date Prepared: N/A

Analysis Batch: 360-62881
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090710c.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	108	99	80 - 120	9	20		
Chromium	106	101	80 - 120	5	20		
Sodium	106	102	80 - 120	3	20		

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62896

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-62896/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1052
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0
Sodium	ND		250	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-62896

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-62896/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1049
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-62896/26
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1142
Date Prepared: N/A

Analysis Batch: 360-62896
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 090810a.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	96	80 - 120	4	20		
Chromium	99	96	80 - 120	4	20		
Sodium	99	95	80 - 120	4	20		

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-63036

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63036/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1106
Date Prepared: N/A

Analysis Batch: 360-63036
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND		0.050	0.050

Lab Control Sample - Batch: 360-63036

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63036/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1121
Date Prepared: N/A

Analysis Batch: 360-63036
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	3.86	96	85 - 115	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-63039

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63039/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1106
Date Prepared: N/A

Analysis Batch: 360-63039
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63039

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63039/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1121
Date Prepared: N/A

Analysis Batch: 360-63039
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.6	103	85 - 115	
Chloride	40.0	39.8	99	85 - 115	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-62783/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1431
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Method Blank - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-62783/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1404
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-63050
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Client: Olin Corporation

Job Number: 360-29919-1

Lab Control Sample - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-62783/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2010 1432
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-62812
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.27	93	85 - 115	

Lab Control Sample - Batch: 360-62783

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-62783/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1405
Date Prepared: 09/03/2010 1039

Analysis Batch: 360-63050
Prep Batch: 360-62783
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.77	98	85 - 115	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62904

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-62904/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1437
Date Prepared: N/A

Analysis Batch: 360-62904
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090800.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Sample - Batch: 360-62904

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-62904/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1414
Date Prepared: N/A

Analysis Batch: 360-62904
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090800.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	98	85 - 115	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62942

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-62942/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1701
Date Prepared: N/A

Analysis Batch: 360-62942
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090801.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Sample - Batch: 360-62942

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-62942/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2010 1702
Date Prepared: N/A

Analysis Batch: 360-62942
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090801.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	99	85 - 115	

Duplicate - Batch: 360-62942

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-29919-3
Client Matrix: Water
Dilution: 2.0
Date Analyzed: 09/08/2010 1711
Date Prepared: N/A

Analysis Batch: 360-62942
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10090801.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	1600	1610	0	20	

Client: Olin Corporation

Job Number: 360-29919-1

Method Blank - Batch: 360-62846

Method: SM 4500 NO2 B
Preparation: N/A

Lab Sample ID: MB 360-62846/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/01/2010 1749
Date Prepared: N/A

Analysis Batch: 360-62846
Prep Batch: N/A
Units: mg/L

Instrument ID: Jenway UV/VIS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Nitrite as N	ND		0.010	0.010

Lab Control Sample - Batch: 360-62846

Method: SM 4500 NO2 B
Preparation: N/A

Lab Sample ID: LCS 360-62846/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/01/2010 1749
Date Prepared: N/A

Analysis Batch: 360-62846
Prep Batch: N/A
Units: mg/L

Instrument ID: Jenway UV/VIS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrite as N	0.100	0.100	100	85 - 115	

State Accreditation Matrix

Method Name	Description	State where Primary Accreditation is Carried				
		New Hampshire (NELAC) prim.	Mass	Conn	Florida (NELAC)	North Carolina
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP			NP	
SM 4500 Cl F	Chlorine, Residual		NP			
SM 9215E	Heterotrophic Plate Count (SimPlate)		P			
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP			
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P			
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P			
1103.1	E.coli		ambient/ source			
Enterolert	Enterococcus					
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	NP/P		
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	NP/P		
6010B	Metals (ICP)(list upon request)	NP/SW		NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	NP/P		
7470A	Mercury (CVAA)	NP		NP		
7471A	Mercury (CVAA)	SW		SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	NP/P		
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		NP/P		
3010A	Preparation, Total Metals	NP/P		NP/P		
3020A	Preparation, Total Metals	NP/P/SW		NP/P/SW		
3050B	Preparation, Metals	SW		SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	P		
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	NP		
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP		NP		
3546	Microwave Extraction	SW				
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		NP		
3540C	Soxhlet Extraction	SW				
3550B	Ultrasonic Extraction	SW		SW		
600/4-81-045	Polychlorinated Biphenyls (PCBs) (GC)		NP	NP		
8081A	Organochlorine Pesticides (GC)(list upon request)	NP/SW		NP/SW		
8082A	PCBs by Gas Chromatography(list upon request)	NP/SW		NP/SW		
8270C	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)			NP/SW		
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	P		
524.2	Trihalomethane compounds	P	P	P		
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	NP		
5035	Closed System Purge and Trap	SW		SW		
5030B	Purge and Trap	NP		NP		
8260B	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
180.1	Turbidity, Nephelometric	P	P	P		
300	Anions, Ion Chromatography	NP/P	NP/P	NP/P		
410.4	COD	NP	NP	NP		
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	NP		
7196A	Chromium, Hexavalent	NP/SW		NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		NP		
9040B	pH	NP		NP		
9045C	pH	SW		SW		
L107041C	Nitrogen, Nitrate	NP	P	NP/P		
L107-06-1B	Nitrogen Ammonia	NP	NP	NP/P		
L204001A CN	Cyanide, Total	P	NP/P	NP/P		
L210-001A	Phenolics, Total Recoverable	NP	NP	NP		
SM 2320B	Alkalinity	NP/P	NP/P	NP/P		
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	NP/P		
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	NP/P		
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	NP		
SM 3500 CR D	Chromium, Hexavalent	NP		NP		
SM 4500 H+ B	pH	NP/P	NP/P	NP/P		
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	NP/P		
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	NP/P		
SM 4500 P E	Phosphorus, Total	NP	NP	NP		
SM 4500 S2 D	Sulfide, Total	NP		NP		
SM 5210B	BOD, 5-Day	NP	NP	NP		
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	NP/P		

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-29919-1

Login Number: 29919

List Source: TestAmerica Westfield

Creator: Beaumier, Janine E

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.0C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica
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Chain of Custody Form

007196

●53 Southampton Road, Westfield, MA 01085, (P) 413-572-4000, (F) 413-572-3707 — Westfield
●240 Bear Hill Rd., Suite 104, Waltham, MA 02451, (P) 781-466-6900, (F) 781-466-6901 — Boston - Service Center

Job#: 360-29919 | Quote#: | PO#:

Client: Olin Corporation
Address: 51 Eames St
Wilmington MA 01887
Phone: 9786586121 Fax: Same

Client Project #:
Site ID & State:
Reports Sent To:
Email: Email Rpt: ☐

Shaded areas for office use
Invoice same as Report to? ☐
If Invoice contact or address different, note in *Comments*

Comments *(Special Instructions)*

Please print legibly. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD ____ RUSH ____ *(Lab Approval Required)*

Regulatory Programs/Presumptive Certainty/QC Forms
MADEP MCP ☐ GW1/S1 ☐ PWS DEP Forms ☐
CTDEP RCP ☐ CT RSR ☐ EDD Required ☐
Std Rpt (L1) ☐ Rpt + QC(L2./MCP ☐ CLP Rpt (L3 or L4) ☐

500-series for drinking water
600-series for wastewater, NPDES
6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define

Sample Type Codes: WW-Wastewater, DW-Drinking Water, SW-Surface Water, GW-Groundwater, LW Lab Water, A-Air, S-Solids/Soil O-Oil, "Z"- Other

Sample I.D.	Sample Type	Sampler's Initials	Date / Time Collected	pH ✓ (lab use only)	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	Na2S2O3	None / 4° C	524 / 624 / 8260	525 / 625 / 8270	PCB / Pest / Herbicide	EPH / VPH	DRO / GRO / ETPH	Metals (Please Specify)	Mercury	General Chemistry	Bacteriological	~~Toxicity~~ Specific Cond	Ammonia-nitrogen	Chloride, sulfate
PZ 18R SW	SW	BG	9/1/10 12:05				4	P																			
ISCO 1	SW	BG	9/1/10 12:20				4	P																			
ISCO 2	SW	BG	9/1/10 1:00				4	P																			
ISCO 3	SW	BG	9/1/10 1:25				4	P																			
PZ 16RRSW	SW	BG	9/1/10 2:00				4	P																			
PZ 17 RR SW	SW	BG	9/1/10 10:25				4	P																			

JB 9/1/10

Comments: Dissolved metals are field filtered

Sampled by (print): Brian Guichard
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	9-1-10	1505	[signature]	9-1-10	1505
[signature]	9-1-10	1700	[signature]	9/1/10	17:00

Cooler ? (Y) N
MADEP Requirement Samples Iced? (Y) N
Temp @ receipt: 30 °C
Preservation / pH checked? (Y) N
By: JB Date: 9/1/10

TestAmerica Westfield

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody Form

007195

●53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707
Westfield

●240 Bear Hill Rd., Suite 104
Waltham, MA 02451
(P) 781-466-6900
(F) 781-466-6901
Boston - Service Center

Client: Olin Corporation
Address: 51 Eames St
Wilmington MA 01887
Phone: 9786586131 Fax: SAME

Client Project #:
Site ID & State:
Reports Sent To: Steve Morrow / Brian Guichard
Email: BGguichard@olin.com Email Rpt: ☐

Job#: 320-29919 Quote# PO#

Shaded areas for office use

Invoice same as Report to? ☐
If Invoice contact or address different, note in *Comments*

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD ____ RUSH ____ *(Lab Approval Required)*

Regulatory Programs/Presumptive Certainty/QC Forms
MADEP MCP ☐ GW1/S1 ☐ PWS DEP Forms ☐
CTDEP RCP ☐ CT RSR ☐ EDD Required ☐
Std Rpt (L1) ☐ Rpt + QC(L2./MCP ☐ CLP Rpt (L3 or L4) ☐

500-series for drinking water
600-series for wastewater, NPDES
6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define.

Comments *(Special Instructions)*

Please print legibly. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Sample Type Codes: WW-Wastewater, DW-Drinking Water, SW-Surface Water, GW-Groundwater, LW Lab Water, A-Air, S-Solids/Soil O-Oil, "Z"- Other

Sample I.D.	Sample Type	Sampler's Initials	Date / Time Collected	pH ✓ (lab use only)	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	Na2S2O3	None / 4° C	524 / 624 / 8260	525 / 625 / 8270	PCB / Pest / Herbicide	EPH / VPH	DRO / GRO / ETPH	Metals (Please Specify)	Mercury	General Chemistry	Bacteriological	Toxicity	See notes
PZ18RSW	SW	BG	9/1/10 12:05				4	P		2	1				1											X
ISCO1	SW	BG	9/1/10 12:20				4	P		2	1				1											X
ISCO2	SW	BG	9/1/10 1:00				4	P		2	1				1											X
ISCO3	SW	BG	9/1/10 1:05				4	P		2	1				1											X
PZ16RRSW	SW	BG	9/1/10 2:00				4	P		2	1				1											X

JB 9/1/10

Comments:
All samples
Ammonia-nitrogen
Nitrate/nitrite
Chloride, sulfate
Specific conductivity
Diss Al/Cr/Na by 6010B
Total Al/Cr/Na by 6010B

Diss metals are field filtered

Sampled by (print): BRIAN GUICHARD 9/1/10
Signature:

Relinquished by: Date: 9/1/10 Time: 3:00
Received by: Date: 9-1-10 Time: 1505

Relinquished by: Date: 9-1-10 Time: 1700
Received by: Date: 9/1/10 Time: 17:00

Relinquished by: Date: Time:
Received by: Date: Time:

Cooler ? (Y) N
MADEP Requirement Samples Iced? (Y) N
Temp @ receipt: 3.0 °C
Preservation / pH checked? (Y) N
By: JB Date: 9/1/10

TestAmerica Westfield

Page 1 of 1

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FILE COPY

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:
10/8/13

ANALYTICAL REPORT

Job Number: 360-30036-1

Job Description: Olin Chemical Surfacewater

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

Approved for release.
Joe Chimi
Report Production Representative
9/23/10 11:46 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/23/2010

Results relate only to the items tested and the sample(s) as received by the laboratory. The test results in this report meet all NELAC requirements for accredited parameters, exceptions are noted in this report. Pursuant to NELAC, this report may not be reproduced except in full, and with written approval from the laboratory. TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY ELAP 10843, North Carolina 647, NELAP PA 68-04386. Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002.

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-30036-1**

Project Location: RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s)):

360-30036-1

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

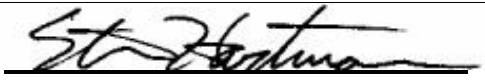
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[ ] Yes [X] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 9/23/10 11:39

CASE NARRATIVE

Client: Olin Corporation

Project: Olin Chemical Surfacewater

Report Number: 360-30036-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 09/09/2010; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.0 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2 C of the required temperature or method specified range. For samples with a specified temperature of 4 C, samples with a temperature ranging from just above freezing temperature of water to 6 C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

TOTAL METALS (ICP)
Sample OC-SD17SW (360-30036-1) was analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The sample was prepared on 09/13/2010 and analyzed on 09/14/2010.

Sodium failed the recovery criteria low for the MS of sample OC-SD17SW (360-30036-1) in batch 360-63147. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. Sodium failed the recovery criteria low for the post digestion spike of sample OC-SD17SW (360-30036-1) and exceeded the % difference limit for the serial dilution of the sample. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analysis.

All other quality control parameters were within the acceptance limits.

DISSOLVED METALS
Sample OC-SD17SW (360-30036-1) was analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The sample was analyzed on 09/21/2010.

Sodium failed the recovery criteria low for the MS of sample OC-SD17SW (360-30036-1) in batch 360-63439. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the dissolved metals analysis.

All other quality control parameters were within the acceptance limits.

ANIONS
Sample OC-SD17SW (360-30036-1) was analyzed for anions in accordance with EPA Method 300.0. The sample was analyzed on 09/09/2010 and 09/21/2010.

Sample OC-SD17SW (360-30036-1)[10X] required dilution prior to analysis due to high target concentration. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analysis.

All quality control parameters were within the acceptance limits.

AMMONIA

Sample OC-SD17SW (360-30036-1) was analyzed for ammonia in accordance with Lachat 107-06-1B. The sample was prepared on 09/14/2010 and analyzed on 09/21/2010.

Sample OC-SD17SW (360-30036-1)[5X] required dilution prior to analysis due to high concentration. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the ammonia analysis.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Sample OC-SD17SW (360-30036-1) was analyzed for specific conductivity in accordance with SM20 2510B. The sample was analyzed on 09/14/2010.

No difficulties were encountered during the conductivity analysis.

All quality control parameters were within the acceptance limits.

EXECUTIVE SUMMARY - Detections

Client: Olin Corporation Job Number: 360-30036-1

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier	Reporting Limit	Units	Method
360-30036-1	**OC-SD17SW**				
Aluminum		1200	100	ug/L	6010B
Chromium		290	5.0	ug/L	6010B
Sodium		99000	2000	ug/L	6010B
Sulfate		310	20	mg/L	300.0
Nitrate as N		1.8	0.050	mg/L	300.0
Chloride		170	10	mg/L	300.0
Ammonia		36	0.50	mg/L	L107-06-1B
Specific Conductance		1200	1.0	umhos/cm	SM 2510B
Dissolved					
Aluminum		250	100	ug/L	6010B
Chromium		110	5.0	ug/L	6010B
Sodium		120000	2000	ug/L	6010B

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-30036-1

Description	Lab Location	Method	Preparation Method
Matrix Water			
Metals (ICP)	TAL WFD	SW846 6010B	
Preparation, Total Metals	TAL WFD		SW846 3010A
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Anions, Ion Chromatography	TAL WFD	MCAWW 300.0	
Anions, Ion Chromatography	TAL WFD	MCAWW 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

LACHAT = LACHAT

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-30036-1

Method	Analyst	Analyst ID
SW846 6010B	Smith, Tim J	TJS
MCAWW 300.0	Emerich, Rich W	RWE
LACHAT L107-06-1B	Emerich, Rich W	RWE
SM SM 2510B	Stewart, Alyse M	AMS

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-30036-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-30036-1	OC-SD17SW	Water	09/09/2010 0925	09/09/2010 1500

SAMPLE RESULTS

Client: Olin Corporation

Job Number: 360-30036-1

Client Sample ID: **OC-SD17SW**

Lab Sample ID: 360-30036-1
Client Matrix: Water

Date Sampled: 09/09/2010 0925
Date Received: 09/09/2010 1500

6010B Metals (ICP)

Method:	6010B	Analysis Batch: 360-63147		Instrument ID:	Varian ICP
Preparation:	3010A	Prep Batch: 360-63066		Lab File ID:	091410b.csv
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	09/14/2010 1302			Final Weight/Volume:	50 mL
Date Prepared:	09/13/2010 0807				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	1200		15	100
Chromium	290		1.0	5.0
Sodium	99000 J		250	2000

6010B Metals (ICP)-Dissolved

Method:	6010B	Analysis Batch: 360-63439		Instrument ID:	Varian ICP
Preparation:	N/A			Lab File ID:	092110c.csv
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	09/21/2010 1528			Final Weight/Volume:	1.0 mL
Date Prepared:					

Analyte	Result (ug/L)	Qualifier	MDL	RL
Aluminum	250		15	100
Chromium	110		1.0	5.0
Sodium	120000 J		250	2000

10/2/10

General Chemistry

Client Sample ID: **OC-SD17SW**

Lab Sample ID: 360-30036-1 Date Sampled: 09/09/2010 0925
Client Matrix: Water Date Received: 09/09/2010 1500

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Nitrate as N	1.8		mg/L	0.050	0.050	1.0	300.0
Analysis Batch: 360-63312	Date Analyzed: 09/09/2010 2048						
Sulfate	310		mg/L	20	20	10	300.0
Analysis Batch: 360-63466	Date Analyzed: 09/21/2010 1749						
Chloride	170		mg/L	10	10	10	300.0
Analysis Batch: 360-63313	Date Analyzed: 09/09/2010 2303						
Nitrite as N	ND		mg/L	0.10	0.10	10	300.0
Analysis Batch: 360-63312	Date Analyzed: 09/09/2010 2303						
Ammonia	36		mg/L	0.50	0.50	5.0	L107-06-1B
Analysis Batch: 360-63430	Date Analyzed: 09/21/2010 1503						
Prep Batch: 360-63132	Date Prepared: 09/14/2010 0930						
Specific Conductance	1200		umhos/cm	1.0	1.0	1.0	SM 2510B
Analysis Batch: 360-63309	Date Analyzed: 09/14/2010 1155						

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-30036-1

Lab Section	Qualifier	Description
Metals		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	W	PS: Post-digestion spike was outside control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	V	Serial Dilution exceeds the control limits

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-30036-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-63066					
LCS 360-63066/2-A	Lab Control Sample	T	Water	3010A	
LCSD 360-63066/3-A	Lab Control Sample Duplicate	T	Water	3010A	
MB 360-63066/1-A	Method Blank	T	Water	3010A	
360-30036-1	OC-SD17SW	T	Water	3010A	
360-30036-1DU	Duplicate	T	Water	3010A	
360-30036-1MS	Matrix Spike	T	Water	3010A	
360-30036-1PDS	Post Digestion Spike	T	Water	3010A	
360-30036-1SD	Serial Dilution	T	Water	3010A	
Analysis Batch:360-63147					
LCS 360-63066/2-A	Lab Control Sample	T	Water	6010B	360-63066
LCSD 360-63066/3-A	Lab Control Sample Duplicate	T	Water	6010B	360-63066
MB 360-63066/1-A	Method Blank	T	Water	6010B	360-63066
360-30036-1	OC-SD17SW	T	Water	6010B	360-63066
360-30036-1DU	Duplicate	T	Water	6010B	360-63066
360-30036-1MS	Matrix Spike	T	Water	6010B	360-63066
360-30036-1PDS	Post Digestion Spike	T	Water	6010B	360-63066
360-30036-1SD	Serial Dilution	T	Water	6010B	360-63066
Analysis Batch:360-63439					
LCS 360-63439/1	Lab Control Sample	T	Water	6010B	
LCSD 360-63439/7	Lab Control Sample Duplicate	T	Water	6010B	
MB 360-63439/2	Method Blank	T	Water	6010B	
360-30036-1	OC-SD17SW	D	Water	6010B	
360-30036-1DU	Duplicate	D	Water	6010B	
360-30036-1MS	Matrix Spike	D	Water	6010B	
360-30036-1SD	Serial Dilution	D	Water	6010B	

Report Basis

D = Dissolved

T = Total

Client: Olin Corporation

Job Number: 360-30036-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-63132					
LCS 360-63132/2-A	Lab Control Sample	T	Water	Distill/Ammonia	
MB 360-63132/1-A	Method Blank	T	Water	Distill/Ammonia	
360-30036-1	OC-SD17SW	T	Water	Distill/Ammonia	
Analysis Batch:360-63309					
LCS 360-63309/1	Lab Control Sample	T	Water	SM 2510B	
MB 360-63309/4	Method Blank	T	Water	SM 2510B	
360-30036-1	OC-SD17SW	T	Water	SM 2510B	
Analysis Batch:360-63312					
LCS 360-63312/4	Lab Control Sample	T	Water	300.0	
MB 360-63312/3	Method Blank	T	Water	300.0	
360-30036-1	OC-SD17SW	T	Water	300.0	
Analysis Batch:360-63313					
LCS 360-63313/4	Lab Control Sample	T	Water	300.0	
MB 360-63313/3	Method Blank	T	Water	300.0	
360-30036-1	OC-SD17SW	T	Water	300.0	
Analysis Batch:360-63430					
LCS 360-63132/2-A	Lab Control Sample	T	Water	L107-06-1B	360-63132
MB 360-63132/1-A	Method Blank	T	Water	L107-06-1B	360-63132
360-30036-1	OC-SD17SW	T	Water	L107-06-1B	360-63132
Analysis Batch:360-63466					
LCS 360-63466/4	Lab Control Sample	T	Water	300.0	
MB 360-63466/3	Method Blank	T	Water	300.0	
360-30036-1	OC-SD17SW	T	Water	300.0	

Report Basis

T = Total

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63066

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-63066/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1248
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0
Sodium	ND		250	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-63066

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-63066/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1251
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-63066/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1254
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	96	80 - 120	4	20		
Chromium	101	99	80 - 120	2	20		
Sodium	98	95	80 - 120	4	20		

Client: Olin Corporation

Job Number: 360-30036-1

Matrix Spike - Batch: 360-63066

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1308
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	1200	5000	6020	95	75 - 125	
Chromium	290	1000	1220	93	75 - 125	
Sodium	99000	20000	114000	74	75 - 125	4

Post Digestion Spike - Batch: 360-63066

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1314
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	1200	5000	5950	94	75 - 125	
Chromium	290	1000	1200	91	75 - 125	
Sodium	99000	20000	113000	72	75 - 125	W

Client: Olin Corporation

Job Number: 360-30036-1

Duplicate - Batch: 360-63066

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1305
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	1200	1410	12	20	
Chromium	290	327	12	20	
Sodium	99000	110000	11	20	

Serial Dilution - Batch: 360-63066

Method: 6010B
Preparation: 3010A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/14/2010 1311
Date Prepared: 09/13/2010 0807

Analysis Batch: 360-63147
Prep Batch: 360-63066
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 091410b.csv
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Sample Result/Qual	Result	%Diff	Limit	Qual
Aluminum	1200	1320	6.4	10	
Chromium	290	309	6.5	10	
Sodium	99000	110000	11	10	V

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63439

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-63439/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1525
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		15	100
Chromium	ND		1.0	5.0
Sodium	ND		250	2000

Lab Control Sample/
Lab Control Sample Duplicate Recovery Report - Batch: 360-63439

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-63439/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1523
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-63439/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1558
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	102	101	80 - 120	1	20		
Chromium	101	100	80 - 120	0.8	20		
Sodium	101	100	80 - 120	0.9	20		

Client: Olin Corporation

Job Number: 360-30036-1

Matrix Spike - Batch: 360-63439

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1535
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	250	5000	5430	104	75 - 125	
Chromium	110	1000	1110	100	75 - 125	
Sodium	120000	20000	133000	69	75 - 125	4

Duplicate - Batch: 360-63439

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1531
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	250	246	2	20	
Chromium	110	111	1	20	
Sodium	120000	118000	0.8	20	

Serial Dilution - Batch: 360-63439

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-30036-1
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 09/21/2010 1538
Date Prepared: N/A

Analysis Batch: 360-63439
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian ICP
Lab File ID: 092110c.csv
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	%Diff	Limit	Qual
Aluminum	250	245	NC	10	J
Chromium	110	113	0.008	10	
Sodium	120000	121000	1.8	10	

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63312

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63312/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1731
Date Prepared: N/A

Analysis Batch: 360-63312
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND		0.050	0.050
Nitrite as N	ND		0.010	0.010

Lab Control Sample - Batch: 360-63312

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63312/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1746
Date Prepared: N/A

Analysis Batch: 360-63312
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	3.78	95	85 - 115	
Nitrite as N	4.00	3.67	92	85 - 115	

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63313

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63313/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1731
Date Prepared: N/A

Analysis Batch: 360-63313
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63313

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63313/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/09/2010 1746
Date Prepared: N/A

Analysis Batch: 360-63313
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Chloride	40.0	38.6	96	85 - 115	

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63466

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-63466/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1232
Date Prepared: N/A

Analysis Batch: 360-63466
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Sample - Batch: 360-63466

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-63466/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1247
Date Prepared: N/A

Analysis Batch: 360-63466
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.4	100	85 - 115	
Chloride	40.0	41.0	102	85 - 115	

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63132

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-63132/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1439
Date Prepared: 09/14/2010 0930

Analysis Batch: 360-63430
Prep Batch: 360-63132
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Sample - Batch: 360-63132

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-63132/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/21/2010 1440
Date Prepared: 09/14/2010 0930

Analysis Batch: 360-63430
Prep Batch: 360-63132
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.61	96	85 - 115	

Client: Olin Corporation

Job Number: 360-30036-1

Method Blank - Batch: 360-63309

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-63309/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1135
Date Prepared: N/A

Analysis Batch: 360-63309
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10091400.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Sample - Batch: 360-63309

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-63309/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/14/2010 1114
Date Prepared: N/A

Analysis Batch: 360-63309
Prep Batch: N/A
Units: umhos/cm

Instrument ID: Autotitrator
Lab File ID: 10091400.TXT
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	98	85 - 115	

State Accreditation Matrix

Method Name	Description	State where Primary Accreditation is Carried				
		New Hampshire (NELAC) prim.	Mass	Conn	Florida (NELAC)	North Carolina
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP			NP	
SM 4500 Cl F	Chlorine, Residual		NP			
SM 9215E	Heterotrophic Plate Count (SimPlate)		P			
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP			
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P			
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P			
1103.1	E.coli		ambient/ source			
Enterolert	Enterococcus					
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	NP/P		
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	NP/P		
6010B	Metals (ICP)(list upon request)	NP/SW		NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	NP/P		
7470A	Mercury (CVAA)	NP		NP		
7471A	Mercury (CVAA)	SW		SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	NP/P		
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		NP/P		
3010A	Preparation, Total Metals	NP/P		NP/P		
3020A	Preparation, Total Metals	NP/P/SW		NP/P/SW		
3050B	Preparation, Metals	SW		SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	P		
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	NP		
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP		NP		
3546	Microwave Extraction	SW				
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		NP		
3540C	Soxhlet Extraction	SW				
3550B	Ultrasonic Extraction	SW		SW		
600/4-81-045	Polychlorinated Biphenyls (PCBs) (GC)		NP	NP		
8081A	Organochlorine Pesticides (GC)(list upon request)	NP/SW		NP/SW		
8082A	PCBs by Gas Chromatography(list upon request)	NP/SW		NP/SW		
8270C	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)			NP/SW		
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	P		
524.2	Trihalomethane compounds	P	P	P		
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	NP		
5035	Closed System Purge and Trap	SW		SW		
5030B	Purge and Trap	NP		NP		
8260B	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			NP/SW		NP/SW
180.1	Turbidity, Nephelometric	P	P	P		
300	Anions, Ion Chromatography	NP/P	NP/P	NP/P		
410.4	COD	NP	NP	NP		
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	NP		
7196A	Chromium, Hexavalent	NP/SW		NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		NP		
9040B	pH	NP		NP		
9045C	pH	SW		SW		
L107041C	Nitrogen, Nitrate	NP	P	NP/P		
L107-06-1B	Nitrogen Ammonia	NP	NP	NP/P		
L204001A CN	Cyanide, Total	P	NP/P	NP/P		
L210-001A	Phenolics, Total Recoverable	NP	NP	NP		
SM 2320B	Alkalinity	NP/P	NP/P	NP/P		
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	NP/P		
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	NP/P		
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	NP		
SM 3500 CR D	Chromium, Hexavalent	NP		NP		
SM 4500 H+ B	pH	NP/P	NP/P	NP/P		
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	NP/P		
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	NP/P		
SM 4500 P E	Phosphorus, Total	NP	NP	NP		
SM 4500 S2 D	Sulfide, Total	NP		NP		
SM 5210B	BOD, 5-Day	NP	NP	NP		
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	NP/P		

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-30036-1

Login Number: 30036

List Source: TestAmerica Westfield

Creator: Beaumier, Janine E

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	0.0C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

Client: Olin Chemical/MACTEC | Project #: 6107-09-0016-04 | Job# 320-30036 | Quote# | PO#

Address: 51 Eames Street | Project Manager: P. Thompson

Wilmington, MA 01887 | Work ID: **Surface Water**

Phone: Fax: | Contact: David Chapman

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Diss Al/Cr/Na by 6010B	Tot. Al/Cr/Na by 6010B	Other	Other	Other	Other	Other	Other	Other
SD 17 SW	SW	BC	9/9/10 9:25	✓		4	P		2	1				1	X	X	X	XX		X							
					JR																						

9/9/10

Dissolved metals are field filtered.

Analysis--
Ammonia Nitrogen--Lac 107-06-1B
Chloride/sulfate--EPA 300
Specific Conductivity--SM 2510B
Nitrate/Nitrite--EPA 300
48 hour hold time on NO2, NO3

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Sampled by (print): BRIAN Gutchard 9/9/10 9:25 Signature:

Relinquished by: Date: 9-9-10 Time: 1030 Received by: Date: 9-9-10 Time: 1030

Relinquished by: Date: 9-9-10 Time: 1500 Received by: Date: 9/9/10 Time: 15:00

Method of shipment:

TestAmerica-Westfield

Cooler ? (Y) / N Samples Iced? (Y) / N

Temp @ receipt: 0.0 °C Not Frozen

Preservation/pH checked

By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)